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45
U. S. DEPARTMENT OF AGRICULTURE.

LIST OF WORKERS IN
SUBJECTS PERTAINING TO AGRICULTURE AND
HOME ECONOMICS IN THE U. S. DEPART-
MENT OF AGRICULTURE AND IN THE
STATE AGRICULTURAL COLLEGES AND
EXPERIMENT STATIONS.

CORRECTED TO AUGUST 1, 1915.



WASHINGTON:
GOVERNMENT PRINTING OFFICE.
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List of Workers in Subjects Pertaining to Agriculture and Home Economics in the U. S. Department of Agriculture and in the State Agricultural Colleges and Experiment Stations.

UNITED STATES DEPARTMENT OF AGRICULTURE.

(Prepared in the Division of Publications,
JOS. A. ARNOLD, *Chief*.)

OFFICE OF THE SECRETARY.

Secretary of Agriculture, DAVID F. HOUSTON.

The Secretary of Agriculture is charged with the work of promoting agriculture in its broadest sense. He exercises general supervision and control over the affairs of the department and formulates and establishes the general policies to be pursued by its various branches and offices.

Assistant Secretary of Agriculture, CARL VROOMAN.

The Assistant Secretary of Agriculture becomes Acting Secretary in the absence of the Secretary and assists in the supervision and administration of the work of the department.

Chief Clerk, ROBERT M. REESE.

The Chief Clerk has general supervision of clerks and employees; of the order of business and of records and correspondence of the Secretary's office; and of expenditures from appropriations for miscellaneous expenses, rents, etc. He is responsible for the enforcement of the general regulations of the department and is custodian of buildings.

Office of the Solicitor, FRANCIS G. CAFFEY, *Solicitor*.

The Solicitor is the legal adviser of the Secretary and the heads of the several branches of the department. He directs and supervises all law work of the department.

Administrative and game laws section. R. W. WILLIAMS, *Assistant to the Solicitor, in charge.*

This section attends to the administration of the general affairs of the office not specifically included in other sections; also prepares reports of violations, briefs, and memoranda, aids in drafting regulations, and assists in the trial of cases under the Lacey Act, migratory bird law, Alaska game law, and protection of bird reserves law.

National forests laws section. FRED LEES, *Assistant to the Solicitor, in charge.*

This section does the law work arising from business of the Forest Service, including contests of claims to lands in the national forests under homestead, mineral, and other laws, cases arising out of timber, fire, fencing, and other trespasses on the national forests, opinions to the Forester and review of opinions presented to the district foresters by assistants to the Solicitor in the field, and various other legal matters connected with the national forests, such as drafting of contracts, regulations, and forms, correspondence with the Attorney General and Secretary of the Interior, and miscellaneous correspondence; also prepares reports of violations, briefs, and memoranda, aids in drafting regulations, and assists in the trial of cases under the plant quarantine law.

Meat inspection, animal quarantine laws, and contract section. C. W. BOYLE, *Assistant to the Solicitor, in charge.*

This section prepares reports of violations, briefs, and memoranda, aids in drafting regulations, and assists in the trial of cases under the meat-inspection, animal quarantine, 28-hour, other animal transportation and virus laws, and drafts informations and indictments in the quarantine and virus cases; also draws bonds, contracts, leases, and other agreements, and prosecutes applications of department employees for patents.

Food and drugs law section. W. C. HENDERSON, *Assistant to the Solicitor, in charge.*

In connection with the Federal Food and Drugs Act, this section prepares recommendations to United States attorneys for seizures, drafts informations and indictments in criminal cases, assists in the trial of important or technical cases, both civil and criminal, prepares notices of judgments, and aids in the conduct of public hearings and in drawing regulations, food-inspection decisions, and other rulings; also prepares reports of violations, briefs, and memoranda, aids in drafting regulations, and assists in the trial of cases under the Seed Importation Act.

Insecticide and fungicide law section. O. H. GATES, *Assistant to the Solicitor, in charge.*

In connection with the Federal Insecticide Act, this section prepares recommendations to United States attorneys for seizures, drafts informations and indictments in criminal cases, assists in the trial of important or technical cases, both civil and criminal, prepares notices of judgments, and aids in drawing regulations, insecticide decisions, and other rulings; also compiles, and revises from time to time, the "Laws Applicable to the United States Department of Agriculture," and handles claims for balances due estates of deceased employees.

Marketing and rural organization section. E. B. QUIGGLE, *Assistant to the Solicitor, in charge.*

This section handles law work in connection with the United States cotton futures act of August 18, 1914; advises the Office of Markets and Rural Organization regarding the legality of various types of cooperative organizations, and concerning legal problems relative to the marketing and distribution of farm products; conducts general correspondence and compiles laws relating to these subjects; also handles fiscal and miscellaneous legal questions.

Acquisition of lands section. A. H. MCCONVILLE, *Assistant to the Solicitor, in charge.*

In connection with the acquisition of lands under the Weeks forestry law (act of Mar. 1, 1911), this section prepares agreements of purchase, supervises and directs the work of title attorneys engaged in the examination of titles, assists United States attorneys in the conduct of condemnation proceedings, and handles correspondence with the Attorney General.

Assistants to the Solicitor, stationed in the field.

Branches of the Office of the Solicitor are located at Missoula, Mont., in charge of D. F. McGowan, assisted by A. W. Herger; Denver, Colo., in charge of G. E. Trowbridge; Albuquerque, N. Mex., in charge of J. O. Seth; Ogden, Utah, in charge of J. F. Lawson; San Francisco, Cal., in charge of H. P. Dechant; and Portland, Oreg., in charge of W. F. Staley. These officers are legal advisers to the district foresters and handle the law work of the Forest Service in the field, besides such local legal work of the department as may be assigned by the Solicitor.

Office of Farm Management. W. J. SPILLMAN, *Agriculturist in charge.*

This office studies the details of farm practice. Its main object is to improve farm practice by introducing better business methods and by applying the principles of science wherever they are known. The types of farming prevailing in the various sections of the country are being studied in a number of localities, and a detailed study of farm economics and business principles is being made.

Scientific staff.—J. H. Arnold, O. E. Baker, G. A. Billings, E. A. Boeger, D. A. Brodie, Junius S. Cates, Levi Chubbuck, R. W. Clothier, J. S. Cotton, M. A. Crosby, L. G. Dodge, J. A. Drake, C. L. Goodrich, Byron Hunter, S. O. Jayne, J. M. Johnson, H. B. McClure, J. C. McDowell, A. D. McNair, H. A. Miller, L. A. Moorhouse, A. G. Smith, Harry Thompson, E. H. Thomson, and E. O. Wooton, agriculturists; C. M. Bennett, F. H. Branch, L. G. Connor, A. J. Dadisman, H. M. Dixon, L. W. Fluharty, D. S. Fox, Earl S. Haskell, C. M. Hennis, C. E. Hoke, M. B. Oates, H. R. Smalley, F. D. Stevens, William B. Walker, and R. E. Willard, assistant agriculturists; H. H. Clark, W. C. Funk, H. W. Hawthorne, L. G. Howell, H. N. Humphrey, R. D. Jennings, Oscar Juve, Earl D. Strait, Thomas H. Summers, S. M. Thomson, H. A. Turner, and A. P. Yerkes, scientific assistants; J. S. Ball, Lillian Church, M. O. Cooper, M. R. Cooper, G. H. Miller, H. G. Strait, and Raymond S. Washburn, assistants in farm cost accounting; V. C. Finch and William G. Reed, assistants in agricultural geography; E. A. Goldenweiser, statistical expert; Frank Montgomery and H. H. Mowry, assistants; L. L. Corbett, assistant farm superintendent; Charles F. Brooks, assistant in farm management; George L. Schultze, cartographer in agricultural geography.

Office of Information. G. W. WHARTON, *Chief.*

The Office of Information is established to secure the widest possible circulation in popular form for the discoveries and recommendations of the scientists, specialists, and field workers of the department. It gives out to the public press agricultural facts taken from publications, official orders, and also from oral statements of specialists. Material so disseminated is set forth in such form as to attract public attention, be easily understandable, and lead to the adoption of the methods recommended. A Weekly News Letter and Department Circular are published. The office also prepares circulars, posters, and pamphlets designed to assist workers in carrying out educational and demonstration plans.

Office of Inspection. ALEX. MCC. ASHLEY, *in charge.*

Acts as the clearing house of the Secretary's Office in fiscal transactions between the bureaus and claimants, and otherwise assists in the fiscal operations of the bureaus; handles personnel inspection matters and fiscal correspondence between the Secretary's Office and the Treasury; prepares certain annual and other reports.

Forest Appeals. THOMAS G. SHEARMAN, *in charge*.

This officer investigates for the Secretary of Agriculture appeals from decisions of the Forest Service, and reports his findings to the Secretary.

Appointment Clerk, R. W. ROBERTS.

The Appointment Clerk prepares all papers connected with appointments, transfers, promotions, reductions, details, furloughs, and removals, and has charge of correspondence with the Civil Service Commission. He is the custodian of oaths of office and personnel reports. He has the custody and use of the department seal.

Office of Exhibits. F. LAMSON-SCHRIENER, *Special Agent on Exhibits*.

The Office of Exhibits handles the correspondence of the department relative to exhibits at fairs and expositions of various kinds; cooperates with the several branches of the department in preparing exposition material; ships, installs, and cares for such exhibits; and investigates methods of displaying them.

WEATHER BUREAU.

Chief, CHARLES F. MARVIN; *Assistant Chief,* C. C. CLARK; *Chief Clerk,* EDGAR B. CALVERT.

The Weather Bureau has charge of the forecasting of the weather; the issue and display of weather forecasts and storm, cold-wave, frost, and flood warnings; the gauging and reporting of river stages; the maintenance and operation of the United States Weather Bureau telegraph and telephone lines; the collection and transmission of marine intelligence for the benefit of commerce and navigation; the reporting of temperature and rainfall conditions for agricultural interests; and the taking of such meteorological and seismological observations as may be necessary to determine and record the climatic and seismic conditions of the United States.

Forecast Division. HENRY E. WILLIAMS, *in charge*.

This division receives and charts, twice daily, telegraphic reports of the prevailing weather conditions and issues a statement of impending weather changes in all parts of the country. In the case of severe disturbances warnings are issued to special storm-warning stations along the Lakes and the seacoast.

River and Flood Division. ALFRED J. HENRY, *in charge*.

This division gives information as to stages of water along the navigable rivers and issues flood warnings. It gathers information on the depth of snowfall in the mountains of the West, for a study of the flow of water in the streams supplying irrigation projects, and on the rate of evaporation from ponds and lakes, in the interest of water storage for irrigation, power development, and navigation. It supervises, on the part of the Weather Bureau, the experiment stations maintained jointly by the Weather Bureau and the Forest Service.

Climatological Division. PRESTON C. DAY, *in charge*.

This division has charge of and supervises the work of about 4,200 cooperative stations, 42 special meteorological stations, and about 400 special stations maintained in connection with the corn, wheat, cotton, sugar, rice, tobacco, and fruit industries. From these are collected the records of daily observations of temperature, precipitation, and other meteorological conditions necessary to establish a history of the climate of the various portions of the United States. Data showing the current weather conditions throughout the country are collected and published weekly during the principal crop-growing season and monthly during the remainder of the year; also weekly during the winter months, showing the depth of snow on the ground and the thickness of ice in the rivers and harbors. It has charge of the preparation of the climatological portion of the annual reports of the bureau and supervises the monthly and annual summaries and other publications of the climatological service of the various States, including the weather conditions over the great cereal and cotton growing districts. This division has charge of the barometry of the United States and of the preparation of the normals of pressure, temperature, precipitation, etc. It also collates from reports of marine observers meteorological information pertaining to the oceans, and is charged with the supervision of the radiotelegraph weather service of the Atlantic and Pacific coasts.

Instrument Division. BENJAMIN C. KADEL, *Chief*.

Has supervision of the entire meteorological instrumental equipment of the Weather Bureau, including exposures and installations at stations; the purchase, comparison, and adjustment of all new meteorological instruments and apparatus for stock and issue; the construction and repair of instruments and apparatus for station equipments; the purchase, installation, and maintenance of automatic recording river gauges, and of the storm-warning towers and lanterns employed at about 300 display stations on the seacoasts and the Great Lakes; and the inspection and personnel of storm-warning stations.

Telegraph Division. THEODORE T. MOORE, *Chief.*

This division receives and transmits all telegrams, arranges and controls telegraph circuits, maintains and repairs United States Weather Bureau telegraph and telephone lines and submarine cables, and examines all telegraph accounts.

Library. CHARLES F. TALMAN, *in charge.*

The library includes standard works of reference and technical books on meteorology and allied sciences and a complete file of the publications of meteorological and climatological services in all parts of the world. A catalogue is prepared of the meteorological contents of all the principal scientific periodicals of the world, including proceedings and transactions of societies. Translations from foreign languages are made in the library. The librarian has charge of the examinations held throughout the bureau for promotion to the scientific grades.

Office of the Editor. CLEVELAND ABBE, *in charge.*

This office edits and supervises the publication of the Monthly Weather Review; it also has general editorial supervision over scientific and semiscientific papers submitted for publication by the bureau, calling attention to such of these as seem appropriate for the Monthly Weather Review or the Journal of Agricultural Research, the daily press, etc. It prepares such summaries and indexes as may be necessary and also notes on the progress of meteorology.

Printing Division. ROBERT SEYBOTH, *Chief.*

This division prints and mails the daily weather map and the various charts and miscellaneous printed matter pertaining to the bureau and has the custody of and distributes station forms.

Division of Supplies. BENJAMIN A. BLUNDON, *Chief.*

This division purchases and issues supplies and is charged with the safe-keeping of all property belonging to the bureau.

Stations and Accounts Division. DELOS T. MARING, *Chief.*

This division audits, adjusts, and prepares for payment all accounts and claims against the bureau; prepares advertisements; issues requests for passenger transportation; prepares the annual estimates of appropriations; transacts all business relating to the financial interests of the bureau; and supervises the construction of Weather Bureau buildings outside of Washington, including repairs thereto.

Solar Radiation Investigations. HERBERT H. KIMBALL, *in charge.*

Principally concerned with measurements of the rate at which heat is received at the surface of the earth by radiation during the day from the sun and sky combined and from each source separately, also that lost at night, and the relation of these measurements to atmospheric conditions.

Seismological Investigations. WILLIAM J. HUMPHREYS, *in charge.*

These investigations include the collection and study of both instrumental records and personal observations of earthquake phenomena throughout the United States. One of the immediate objects in view is the detailed mapping of the country with reference to existing faults on the lines of weakness of the earth's crust as evidenced by breaks or movements thereon that occasionally take place causing small local earthquakes. Such maps are of interest to those who have occasion to locate dams and similar important permanent structures.

Aerological Investigations. WILLIAM R. BLAIR, *in charge.*

This work includes the exploration of the upper atmosphere, to altitudes of 3 to 10 miles, by means of kites and balloons, and the discussion of the data thus obtained in its relation to conditions at the earth's surface. The principal observing station is now located at Drexel, Nebr., having been transferred from Mount Weather, Va.

Weather Bureau stations and work outside of Washington, D. C.

This bureau maintains throughout the United States, in the West Indies, and in Hawaii about 200 meteorological stations employing from 1 to 10 men each.

For forecast purposes the United States is divided into districts comprising: (1) The upper Mississippi Valley and the Northwest, Henry J. Cox, Chicago, Ill., in charge. (2) Louisiana, Texas, Arkansas, and Oklahoma, Isaac M. Cline, New Orleans, La., in charge. (3) Utah, Colorado, New Mexico, and Arizona, Frederick H. Brandenburg, Denver, Colo., in charge. (4) California and Nevada, George H. Willson, San Francisco, Cal., in charge. (5) Washington, Oregon, and Idaho, Edward A. Beals, Portland, Oreg., in charge. (6) The remainder of the United States, forecaster on duty (Harry C. Frankensfield or Edward H. Bowie), Washington, D. C., in charge.

For the collection and distribution of climatological data the United States, including Porto Rico and Hawaii, is divided into 44 sections, generally coextensive with States, which, with the names of the officials in charge and the section centers, are as follows:

Alabama: Patrick H. Smyth, Montgomery.
 Arizona: Robert R. Briggs, Phoenix.
 Arkansas: Harvey S. Cole, Little Rock.
 California: George H. Willson, San Francisco.
 Colorado: Frederick H. Brandenburg, Denver.
 Florida: Alexander J. Mitchell, Jacksonville.
 Georgia: Charles F. von Herrmann, Atlanta.
 Hawaii: William B. Stockman, Honolulu.
 Idaho: Edward L. Wells, Boise.
 Illinois: Clarence J. Root, Springfield.
 Indiana: John H. Armington, Indianapolis.
 Iowa: George M. Chappel, Des Moines.
 Kansas: Thorp B. Jennings, Topeka.
 Kentucky: Ferdinand J. Walz, Louisville.
 Louisiana: Isaac M. Cline, New Orleans.
 Maryland and Delaware: Oliver L. Fassig, Baltimore, Md.
 Michigan: Charles F. Schneider, Grand Rapids.
 Minnesota: Ulysses G. Purssell, Minneapolis.
 Mississippi: William E. Barron, Vicksburg.
 Missouri: George Reeder, Columbia.
 Montana: Henry F. Alps, Helena.

Nebraska: George A. Loveland, Lincoln.
 Nevada: Henry F. Alciatore, Reno.
 New England: John W. Smith, Boston, Mass.
 New Jersey: G. Harold Noyes, Trenton.
 New Mexico: Charles E. Linney, Santa Fe.
 New York: Wilford M. Wilson, Ithaca.
 North Carolina: Lee A. Denson, Raleigh.
 North Dakota: Orris W. Roberts, Bismarck.
 Ohio: J. Warren Smith, Columbus.
 Oklahoma: J. Pemberton Slaughter, Oklahoma.
 Oregon: Edward A. Beals, Portland.
 Pennsylvania: George S. Bliss, Philadelphia.
 Porto Rico: F. Eugene Hartwell, San Juan.
 South Carolina: Richard H. Sullivan, Columbia.
 South Dakota: Montello E. Blystone, Huron.
 Tennessee: Roscoe Nunn, Nashville.
 Texas: Bernard Bunnemeyer, Houston.
 Utah: Alfred H. Thiessen, Salt Lake City.
 Virginia: Edward A. Evans, Richmond.
 Washington: George N. Salisbury, Seattle.
 West Virginia: Henry C. Howe, Parkersburg.
 Wisconsin: Henry B. Hersey, Milwaukee.
 Wyoming: Robert Q. Grant, Cheyenne.

BUREAU OF ANIMAL INDUSTRY.

Chief, A. D. MELVIN; *Assistant Chief*, JOHN R. MOHLER; *Chief Clerk*, CHARLES C. CARROLL.

The Bureau of Animal Industry has charge of the work of the department relating to the live-stock industry. In general it deals with the investigation, control, and eradication of diseases of animals, the inspection and quarantine of live stock, the inspection of meat and meat food products, and with animal husbandry and dairying.

Animal Husbandry Division. GEORGE M. ROMMEL, *Chief*.

This division studies the breeding and feeding of farm animals and poultry, and passes upon the pure breeding of animals imported into the United States for breeding purposes. The division is engaged in work in cooperation with the War Department in encouraging the breeding of horses for military purposes. It studies also the cost of production of poultry and eggs, methods of improving the quality of farm eggs, and is engaged in the organization of boys' and girls' pig and poultry clubs in cooperation with the States Relation Service of the department and State agricultural colleges.

Staff.—G. Arthur Bell, senior animal husbandman in horse investigations; Harry M. Lamon, senior animal husbandman in poultry investigations; W. F. Ward, senior animal husbandman in beef cattle investigations; F. R. Marshall, senior animal husbandman in sheep and goat investigations; W. F. Hammond, animal husbandman in charge of Morgan Horse Farm and first horse-breeding district, Middlebury, Vt.; H. H. Reese, animal husbandman in charge of second horse-breeding district, Front Royal, Va.; R. G. Lawton, in charge of third horse-breeding district, Lexington, Ky.; William P. Little, junior animal husbandman in charge of Colorado horse-breeding station, Fort Collins, Colo.; E. L. Shaw, senior animal husbandman in charge of work of this division at the experiment farm, Beltsville, Md.

Biochemic Division. M. DORSET, *Chief*.

This division prepares tuberculin and mallein for free distribution to health officers for use in official tests; conducts experiments with the object of obtaining vaccines and antitoxins for animal diseases; carries on researches concerning the causes of certain infectious diseases; conducts field demonstrations of methods for controlling hog cholera; takes part in the control of viruses, serums, toxins, and analogous products intended for use in the treatment of domestic animals; carries on experiments with dips and disinfectants; and assists in enforcing the insecticide act of 1910 by examining articles intended for use in combating insects and fungi which infest domestic animals. In connection with the meat inspection service, it makes bacteriological and chemical examination of meats and meat food products and of condiments, etc., used in their preparation.

Scientists in charge of sections.—J. A. Emery, assistant chief and member of the Insecticide and Fungicide Board; C. N. McBryde, in charge of bacteriological investigations of meats; R. M. Chapin, in charge of dips and disinfectants; Ralph Hoagland, in

charge of biochemical investigations of meats; W. B. Niles, in charge of hog-cholera serum production; H. J. Shore, in charge of inspection of plants producing hog-cholera virus and serum, tuberculin, and mallein; U. G. Houck, in charge of cooperative hog-cholera demonstration work; O. B. Hess, in charge of county experiments in eradication of hog cholera.

Dairy Division. B. H. RAWL, *Chief*.

This division collects and disseminates information concerning dairy farming, the care and improvement of dairy cattle, and the production, care, and distribution of dairy products. It is charged also with the details of administration of the laws concerning the inspection of factories and markets for "renovated" or "process" butter. It carries on research concerning the chemistry and bacteriology of dairy products and in engineering problems that affect various branches of the dairy industry. It also cooperates with State and local institutions in educational work in dairying.

Miscellaneous.—D. Stuart, dairy husbandry; K. E. Parks and J. T. Bowen, dairy engineers.

Research laboratories.—L. A. Rogers, in charge; S. H. Ayers, F. R. Cammack, W. M. Clark, P. W. Clemmer, J. N. Currie, B. J. Davis, E. F. Deysher, D. C. Dyer, Alice C. Evans, W. T. Johnson, jr., H. F. Jones, H. A. Lubs, K. J. Matheson, C. A. Menge, P. Rupp, R. H. Shaw, O. E. Williams, P. A. Wright.

Dairy farming investigations and demonstrations.—Helmer Rabild, in charge; H. P. Davis, Melvin Moss, R. C. Jackson, E. A. Onsrud. This work includes: (1) Southern dairying.—J. H. McClain, in charge; F. H. Denniss, F. H. Farnham, W. W. Fitzpatrick, L. A. Higgins, C. A. Hutton, J. P. Lamaster, N. A. Negley, A. J. Reed. (2) Dairy work in tick-free areas.—J. A. Arey, W. H. Howell, R. H. Mason, T. W. Moseley, J. C. Nelson, H. C. Stockwell, D. W. Watkins. (3) Dairy community development.—R. R. Welch. (4) Cow-testing associations and bull associations, and dairy work with county agents.—A. M. Goodman, H. Fergus, W. L. Kellogg, Ivan McKellip, W. E. Meyer, C. L. Burlingham, G. L. Oliver, G. E. Wolcott. (5) Dairy demonstration farm in Texas.—S. B. Durham. (6) Holstein-Friesian breeding circuit in North Dakota.—U. J. Downey.

Dairy manufacturing investigations and renovated-butter inspection.—S. C. Thompson, in charge; E. L. Chaplin, T. Corneliussen, A. O. Dahlberg, C. F. Doane, C. W. Fryhofer, G. A. Gilbert, M. W. Lang, W. B. Liverance, F. L. Odell, M. P. A. Sondergaard, O. A. Storvick, J. L. Thomas, W. B. Thurston, P. Van Allsburg, Wm. White.

Market milk investigations.—Ernest Kelly, in charge; J. B. Bain, C. E. Clement, L. B. Cook, J. A. Gamble, R. S. Smith.

Western dairy investigations.—J. E. Dorman, in charge; W. A. Barr, F. H. Bothell, E. F. Burton, B. R. Eldredge, F. W. Kehrl, G. E. Frevert, F. M. Hillman, C. E. Johnson, A. J. Lashbrook, R. W. Latta, V. E. Scott, J. G. Winkjer.

Beltville farm.—T. E. Woodward, superintendent.

Field Inspection Division. R. A. RAMSAY, *Chief*; W. P. ELLENBERGER, *Assistant*.

This division, in cooperation with the State authorities, is charged with the work of eradicating scabies in cattle and sheep and the eradication of ticks which infest cattle and transmit disease; also, in cooperation with the Office of Indian Affairs and State authorities, with the eradication of glanders. It has supervision of the interstate transportation of live stock, including inspection, disinfection, certification, etc.; also of the details of administering the 28-hour law governing the humane handling of live stock in transit, and the tuberculin testing of cattle and the mallein testing of horses, etc., for interstate movement. This division has charge of the emergency work of eradicating foot-and-mouth disease.

Inspectors in charge of scabies eradication in the field.—H. J. Hammond, Sacramento, Cal.; H. E. Pinkerton, Walla Walla, Wash.; F. E. Murray, Salt Lake City, Utah; F. L. Schneider, Albuquerque, N. Mex.; W. E. Howe, Denver, Colo.; R. H. Treacy, Bismarck, N. Dak.; James Fleming, Kansas City, Kans.; A. W. Miller, South Omaha, Nebr.

Inspectors in charge of tick eradication in the field.—W. M. MacKellar, San Diego, Cal.; L. J. Allen, Fort Worth, Tex.; F. W. Brewer, Oklahoma, Okla.; A. E. Wight, Little Rock, Ark.; J. A. Kiernan, Birmingham, Ala.; E. M. Nighbert, Atlanta, Ga.; W. K. Lewis, Clemson College, S. C.; T. M. Owen, Norfolk, Va.

Inspector in charge of tuberculosis eradication.—J. S. Jenison, Chicago, Ill.

Meat Inspection Division. R. P. STEDDOM, *Chief*.

The work of the Meat Inspection Division includes the ante-mortem and post-mortem inspection of cattle, sheep, swine, and goats slaughtered at establishments engaged in interstate or foreign commerce; the supervision of such establishments and of the various processes of preparing, curing, canning, packing, etc., so as to insure sanitary conditions, equipment, and methods; the condemnation and proper disposal of carcasses and products found to be diseased, unwholesome, or otherwise unfit for human food;

the marking and certification of meats and products that have been inspected and passed; and the regulation and supervision of the interstate transportation, exportation, and importation of meats and meat food products.

Assistants.—George Ditlewlg, in charge of western division; A. J. Pistor, in charge of eastern division.

G. H. Parks, architect; G. H. Shaw, sanitary engineer.

A directory showing the various meat-inspection stations and inspectors in charge may be obtained on application to the bureau.

Miscellaneous Division. A. M. FARRINGTON, *Chief*; IRVING W. PEW, *Assistant Chief, in charge of Appointment Section.*

This division keeps the records of the projects of work in which the bureau is engaged; has charge of the work relating to the personnel, such as appointments, transfers, assignments to duty, efficiency records, etc.; endeavors to promote veterinary education and to assist veterinary colleges in providing adequate courses of instruction to qualify men for the veterinary service of the bureau; and attends to miscellaneous duties.

Pathological Division. ADOLPH EICHHORN, *Chief.*

This division conducts scientific investigations of animal diseases; carries on experiments with immunizing agents for the purpose of protecting animals against disease; cooperates with the State agricultural experiment stations with a view to combating diseases peculiar to the localities; determines pathological specimens referred to the division for diagnosis; and prepares and distributes blackleg vaccine.

Scientific staff.—Henry J. Washburn, senior bacteriologist; J. S. Buckley, in charge of field investigations; A. R. Ward, in charge of investigations of viruses, serums, and toxins; B. A. Gallagher, in charge of investigations concerning diseases of poultry and cold-blooded animals; Charles F. Flocken, in charge of cooperative experiments with the Minnesota Experiment Station; Robert J. Formad, assistant in animal pathology; George M. Potter, assistant in animal bacteriology; John M. Buck, assistant in bacteriology, in charge of experiments on dourine; H. W. Schoening, in charge of experiments on glanders; L. T. Giltner, veterinary inspector, assisting in experiments on dourine; R. A. Kelser, in charge of blackleg investigations; C. D. Marsh, in charge, and Hadleigh Marsh and A. B. Clawson, assistants, in investigations of poisonous plants; W. U. Berg, in charge of physiological investigations; H. C. Campbell, in charge of experiments in cooperation with the Pennsylvania Live Stock Sanitary Board; W. L. Williams, in charge of experiments on contagious abortion of cattle in cooperation with Cornell University; L. Enos Day, in charge of branch pathological laboratory at Chicago, Ill.; George Byron Morse, in charge of branch pathological laboratory at South Omaha, Nebr.

Quarantine Division. RICHARD W. HICKMAN, *Chief.*

The inspection and quarantine of imported animals with a view to excluding contagion, the management of the animal quarantine stations, and the inspection of live stock for export come under this division. The ships carrying exported animals are also inspected, and regulations as to fittings, equipment, ventilation, feed, water, attendants, etc., are enforced. The Quarantine Division administers the sanitary regulations governing the importation of hides, hay, and straw, and directs the tuberculin testing of cattle and the mallein testing of horses for export and import. It also carries on work in cooperation with State and other authorities for the intrastate tuberculin testing of dairy and breeding cattle and the cows supplying milk to cities, with a view to eliminating tuberculosis from such cattle. Plans are being formulated to cooperate with State live stock sanitary boards, breeders' record associations, and individual breeders for the tuberculin testing and recording with the bureau of pure-bred animals for breeding purposes, with the view to facilitating the sale, purchase, and interchange of such animals certified as free from tuberculosis or exposure thereto through association with tuberculous animals.

Staff.—George W. Pope, assistant chief; B. T. Woodward, in charge of tuberculin testing of dairy cattle.

Zoological Division. B. H. RANSOM, *Chief.*

This division investigates diseases of parasitic origin, collects and describes animal parasites of all kinds, determines such parasites as are sent to the bureau for identification, and keeps a card index of animal parasites and a bibliography of literature relating to them.

Scientific staff.—Albert Hassall, assistant zoologist; M. C. Hall, in charge of investigations on the treatment of internal parasites; Howard Crawley, in charge of investigations of parasitic protozoa; W. D. Foster, junior zoologist; Marion Imes, in charge of investigations on the treatment of external parasites, Kansas City, Kans.; Cooper Curtice, in charge of experiments in the eradication and control of internal parasites of sheep, Vienna, Va.

Experiment Station. E. C. SCHROEDER, *Superintendent*; W. E. COTTON, *Assistant*.

The Experiment Station of the bureau is located at Bethesda, Md. It conducts investigations of animal diseases with a view to their control and eradication and their bearing on the public health. A small farm is maintained in such a manner as to provide the other divisions of the bureau with facilities for making observations for which large domestic animals are needed. The work of the station consists of both independent original investigations and investigations in cooperation with and supplemental to those of the other divisions.

Assistants.—W. E. Cotton, George W. Brett.

Editorial Office. JAMES M. PICKENS, *Editor*.

This office edits manuscripts prepared in the bureau, compiles and prepares information and material for publication and other uses, attends to correspondence relating to the publications and to miscellaneous subjects, makes translations, reads proof, duplicates circular letters, etc.

FOREST SERVICE.

Forester, HENRY S. GRAVES; *Associate Forester*, ALBERT F. POTTER.

The Forest Service administers the national forests, studies forest conditions and methods of forest utilization, investigates the mechanical and physical properties of woods and the processes employed in the manufacture of forest products, and gathers information concerning the needs of the various wood-using industries and the relation of forests to the public welfare generally.

The work of the Forest Service is organized under the Office of the Forester, 5 branches, 7 districts, 154 national forests, and 16 purchase areas.

Office of the Forester.

Office of the Editor. HERBERT A. SMITH, *Editor*; FINDLEY BURNS, *in charge of technical review*; DON CARLOS ELLIS, *in charge of educational cooperation*; C. M. BALLARD, *in charge of proofs and forms*.

This office disseminates information concerning forestry through the public press and other channels, and performs the editorial and educational work of the service, including the review and proof reading of publications and forms; cooperation with teachers, officers of public instruction, and others; the preparation, installation, and care of forest exhibits; and the care and use of the lantern-slide collection.

Dendrologist. GEORGE B. SUDWORTH.

The dendrologist is charged with investigations relating to the life history of native and exotic forest trees, their geographic distribution, distinguishing characteristics, habits and associations in the formation of forests, etc.; also the selection, adaptation, and care of trees for shade and ornamental purposes.

Expert Lumberman. EUGENE S. BRUCE.

The expert lumberman advises the Forester in matters regarding lumbering operations on the national forests and elsewhere.

Accounts. M. E. FAGAN, *Chief*; A. W. SMITH, *Assistant Chief*.

This office is in charge of all fiscal affairs pertaining to the Forest Service—general bookkeeping, controlling accounts, allotments, and liabilities, and all operations of district fiscal agents.

Water Power. O. C. MERRILL, *Chief Engineer*; T. W. NORCROSS, *Assistant Chief Engineer*; R. R. RANDELL, *Junior Engineer*.

The work of this office includes the handling of all routine connected with the occupancy and use of forest land for hydroelectric power purposes, and of all reports to the Department of the Interior upon rights of way granted by the Secretary of the Interior upon such lands. It also has charge of road-construction work under the provisions of the act of August 10, 1912, appropriating 10 per cent of the annual gross revenue of the national forests for road construction.

Branch of Operation.

JAMES B. ADAMS, *Assistant Forester in charge*; D. D. BRONSON, *Forest Inspector*; ALLEN S. PECK, *Forest Inspector*; G. G. ANDERSON, *Inspector of Records*; W. J. MANGAN, *Examiner*.

This branch has general supervision of the personnel, quarters, equipment, and supplies, and of fire protection and permanent improvement work on the national forests.

Geography. C. A. KOLB, *Chief*.

This office collects and preserves maps, compiles general maps and folios for the Forest Atlas, supervises the engraving and printing of maps and diagrams, tabulates forest statistics, collects and records data showing the status of lands within the national forests, and performs photographic work for the service.

Maintenance. GEORGE A. BENTLEY, *Chief*.

The work of this office includes all matters relating to the care of quarters and the purchase and custody of supplies, furniture, instruments, and other equipment in Washington, D. C.

Branch of Silviculture.

W. B. GREELEY, *Assistant Forester in charge*; R. Y. STUART, *Forest Inspector*; E. E. CARTER, *Forest Inspector*; AUSTIN CARY, *Logging Engineer*; HARRY IRION, *Office Assistant*.

Through the district foresters the Branch of Silviculture has supervision of timber sales, timber and fire trespass, and reforestation on the national forests, and of working plans for their better administration. It cooperates with the States and private owners in fire protection and the practice of forestry.

State Cooperation. J. G. PETERS, *Chief*.

This office, in cooperation with the States, investigates forest conditions and suggests needed legislation and forest policies; prepares digests of State forest laws; cooperates with a number of States, under the Weeks law (act of Mar. 1, 1911), in the protection of the watersheds of navigable streams; directs expenditures for this purpose; and inspects the work done in the field.

Inspection—L. S. Murphy.

Development of Private Forestry. E. S. BRYANT, *Chief*.**Branch of Grazing.**

ALBERT F. POTTER, *Associate Forester, in charge*; WILL C. BARNES, *Assistant Forester*; J. W. NELSON, *Inspector of Grazing*.

The Branch of Grazing has, through the district foresters, general supervision of the range in the national forests. When the number of stock to be allowed on each national forest has been determined by the Secretary of Agriculture, the Branch of Grazing establishes the year-long grazing fee to be charged for each class of stock. It also conducts investigations concerning the best use of the forage resources of the national forests.

Grazing Studies. JAMES T. JARDINE, *Inspector of Grazing, in charge*.

This office deals with investigations aimed to bring about more efficient utilization by permitted live stock of the annual forage crop produced on ranges within national forests. It is also directing the survey and type classification of range lands within national forests by range reconnaissance.

Branch of Lands.

E. A. SHERMAN, *Assistant Forester in charge*.

This branch has general supervision of all matters relating to the application of the public-land laws to the lands within the national forests, and the uses of national forest lands other than timber sales and grazing.

Land Classification. JOHN D. JONES, *in charge*.

Examination and classification of lands within the national forests to determine their value for forest purposes.

Settlement.—F. L. Harvey, *in charge*. Administration of the Forest Homestead Act of June 11, 1906.

Boundaries.—B. L. Wheeler, *in charge*. Revision of forest boundaries and general classification of lands within national forests as to their value for forest purposes.

Entry Surveys.—R. V. R. Reynolds, *in charge*. Survey of forest homesteads in the national forests under instructions issued by surveyors general of the General Land Office.

Claims and Occupancy. CHARLES H. SQUIRE, *in charge*.

The work of this office includes all matters relating to claims on the national forests prior to proceedings before registers and receivers on hearings ordered. The office cooperates with the Office of the Solicitor in procuring necessary evidence to sustain the department's contests; it is also concerned with all questions relating to the occupancy of national forest land for purposes other than timber sales or grazing.

Branch of Research.

EARLE H. CLAPP, *Assistant Forester in charge.*

This branch has general supervision, either directly or through the district foresters, of forest investigations, protection studies, the silvicultural experiment stations, and the Forest Products Laboratory; investigations of wood, wood products, the lumber and other wood-using industries, logging costs, mill and market studies, forest statistics, including the collection of statistics of the wood-using industries, general economic questions bearing on forestry, and forest administration.

Forest Investigations. RAPHAEL ZON, *Chief*; S. T. DANA, *Assistant Chief.*

The Office of Forest Investigations deals mainly with the scientific problems underlying the management of forests. It directs the work at the national forest experiment stations through the district foresters and investigates the factors controlling the distribution of forests and forest trees, the relation of forests to stream flow and climate, the conditions under which natural regeneration of cut-over, burned-over, or otherwise denuded areas takes place, and the species and methods adapted to use in artificial reforestation under varying site conditions. It also studies the requirements of important species as to climate, soil, moisture, and light. The office conducts investigations of wood lots and, in cooperation with the extension agents of the States, demonstrates the best methods of handling them with special reference to marketing the product and caring for the timber crop. The library of the Forest Service is connected with this office; it contains 18,200 books and pamphlets on forestry and allied subjects.

Studies.—E. H. Frothingham, W. D. Sterrett, C. R. Tillotson, G. N. Lamb, W. R. Mattoon, Benton MacKaye, G. E. Clement, C. H. Shinn.

Forest Distribution.—W. H. Lamb.

Forest Measurement.—W. B. Barrows.

Compilation.—Elizabeth Leech.

Industrial Investigations. H. S. BETTS, *in charge.*

This office studies the wood-using industries of various States, woods used in manufacture, and methods of disposing of mill waste; collects statistics on the price of lumber at the mill and at the principal distributing markets of the country; and studies specifications and grading rules. The office also secures statistics of importance to the experimental work of the service and studies the movements of lumber to and from the principal markets.

Studies.—J. C. Nellis, J. T. Harris, S. L. Wolfe, W. D. Brush, D. G. White, R. K. Helpenstine, jr., and A. H. Pierson.

Laboratory. HOWARD F. WEISS, *Director*; C. P. WINSLOW, *Administrative Assistant.*

A forest-products laboratory is maintained in cooperation with the University of Wisconsin, at Madison. The laboratory conducts the following classes of experimental investigations in the utilization of forest products: (1) Investigation of problems in experimental research; (2) experimental work in cooperation with commercial operations to verify laboratory experiments on a commercial scale; (3) cooperation with individuals or companies to assist them in applying principles and processes of proved commercial value. The lines of work pursued include wood preservation, wood chemistry, timber tests, and wood technology.

Commercial Extension.—Rolf Thelen.

Derived Products.—Dr. S. F. Acree, *in charge.*

Engineering.—A. L. Heim, *in charge.*

Pulp and Paper.—Sidney D. Wells, *in charge.*

Timber Tests.—John A. Newlin, *in charge.*

Timber Physics.—H. D. Tiemann, *in charge.*

Wood Preservation.—C. H. Teesdale, *in charge.*

Pathology.—C. J. Humphrey, *in charge.*

Acquisition of Lands under the Weeks Law.

WM. L. HALL, *Assistant Forester in charge*; W. W. ASHE, *in charge of examination of lands*; R. DIEFFENBACH, *in charge of survey of lands.*

This office designates the areas where lands are to be purchased, receives proposals, examines lands, conducts tentative negotiations, and prepares recommendations to the Secretary of Agriculture and the National Forest Reservation Commission on lands to be acquired under the act of March 1, 1911, for the protection of the watersheds of navigable streams.

Districts.

District 1.—National forests in northern Idaho, Montana, North Dakota, and the north-west corner of South Dakota; headquarters at Missoula, Mont. F. A. Silcox, district forester; E. W. Kramer, district engineer.

District 2.—National forests in Colorado, Kansas, Nebraska, the greater part of South Dakota, eastern and central Wyoming, Minnesota, and Michigan; headquarters at Denver, Colo. Smith Riley, district forester; Lyle A. Whitsit, hydroelectrical engineer.

District 3.—National forests in most of Arizona and all of New Mexico; headquarters at Albuquerque, N. Mex. A. C. Ringland, district forester; Lyle A. Whitsit, hydroelectrical engineer.

District 4.—National forests in Utah, northwestern Arizona, most of Nevada, southern Idaho, and western Wyoming; headquarters at Ogden, Utah. L. F. Kneipp, district forester; J. P. Martin, district engineer.

District 5.—National forests in California and western Nevada; headquarters at San Francisco, Cal. Coert Du Bois, district forester; F. H. Fowler, district engineer.

District 6.—National forests in Washington, Oregon, northwestern California, and Alaska; headquarters at Portland, Oreg. George H. Cecil, district forester; E. Leonard Lundgren, district engineer.

District 7.—National forests and purchase areas in Arkansas, Florida, Oklahoma, Porto Rico, South Carolina, Georgia, North Carolina, Tennessee, Virginia, West Virginia, and New Hampshire; headquarters at Washington, D. C. W. L. Hall, district forester; F. W. Reed, assistant district forester; K. W. Woodward, forest inspector; H. O. Stabler, assistant district forester.

Within each district (except district 7) the Offices of Operation, Silviculture, Grazing, Products, and Lands perform duties similar to those performed by the corresponding branches outside the districts. The assistant district foresters in charge of these offices in the several districts are as follows:

Operation.—(1) R. H. Rutledge; (2) Fred W. Morrell; (3) A. O. Waba; (4) A. C. McCain; (5) Roy Headley; (6) C. H. Flory.

Silviculture.—(1) J. F. Preston; (2) C. M. Granger; (3) O. M. Butler; (4) Clinton G. Smith; (5) T. D. Woodbury; (6) F. E. Ames.

Grazing.—(1) C. H. Adams; (2) John H. Hatton; (3) John Kerr; (4) Homer E. Fenn; (5) C. E. Rachford; (6) T. P. McKenzie.

Products.—(5) C. S. Smith; (6) H. B. Oakleaf; (7) S. L. Wolfe.

Lands.—(1) F. A. Fenn; (2) C. J. Stahl; (3) Frank C. W. Pooler; (4) T. C. Hoyt; (5) L. A. Barrett; (6) C. J. Buck.

BUREAU OF PLANT INDUSTRY.

Physiologist and Pathologist and Chief of Bureau, WILLIAM A. TAYLOR; *Physiologist and Assistant Chief of Bureau*, KARL F. KELLERMAN; *Chief Clerk*, JAMES E. JONES; *Officer in charge of publications*, J. E. ROCKWELL; *Officer in charge of records*, W. P. Cox.

The Bureau of Plant Industry studies plant life in all its relations to agriculture. The scientific work of the bureau is divided into 32 distinct groups, over each of which is placed a scientifically trained officer, who reports directly to the chief and assistant chief of the bureau. The work of the bureau is conducted on the project plan, the investigations under each of the offices being arranged by group projects consisting of closely related lines of work. These group projects are further divided into subprojects.

Laboratory of Plant Pathology. ERWIN F. SMITH, *Pathologist in charge*.

This is the central working laboratory for all of the pathological investigations conducted by the bureau. Studies of the diseases of a wide variety of crop plants are made in the laboratory and supplemented by field investigations and experimentation.

Scientific staff.—R. E. B. McKenney, pathologist; Frederick V. Rand, Florence Hedges, Nellie A. Brown, and Lucia McCulloch, assistant pathologists; Mary K. Bryan, Ella M. Enlows, and Lillian C. Cash, scientific assistants.

Pathological Collections and Inspection Work. FLORA W. PATTERSON, *Mycologist in charge*.

This office maintains economic collections of pathological and related material; identifies edible and poisonous fungi; studies problems in entomogenous fungi; conducts taxonomic work in cooperation with various offices of the bureau; and makes miscellaneous identifications. In addition to securing new species of pathological fungi and systematically inserting them where they may be readily available for study, card indexes are maintained which refer to descriptions of fungi or relate to mycological or pathological subjects. According to the regulations of the Federal Horticultural Board, systematic inspections are made of all plants received or distributed by the offices of Foreign Seed and Plant

Introduction, Crop Physiology and Breeding Investigations, Gardens and Grounds, and Congressional Seed Distribution, in order to prevent the introduction or dissemination of plant diseases.

Scientific staff.—Vera K. Charles, assistant mycologist; Hally D. M. Jolivet and Anna E. Jenkins, scientific assistants; Edith K. Cash, botanical translator.

Fruit-Disease Investigations. MERTON B. WAITE, *Pathologist in charge.*

These studies deal with diseases of fruits and fruit trees and methods of controlling or preventing them. They cover deciduous orchard fruits, citrus fruits, small fruits, and the cultivated nuts. Field demonstrations are an important part of the work.

Scientific staff.—C. L. Shear, Charles Brooks, J. G. Grossenbacher, W. S. Ballard, and J. W. Roberts, and Neil E. Stevens, pathologists; S. M. McMurrin, assistant pathologist; Clara H. Hasse, Durward F. Fisher, J. S. Cooley, E. M. Harvey, Angie M. Beckwith, Lee M. Hutchins, and Raymond B. Wilcox, scientific assistants; J. M. Shull, botanical artist; and Leslie Pierce, assistant in spraying experiments and demonstrations.

Investigations in Forest Pathology. HAVEN METCALF, *Pathologist in charge.*

This office studies various diseases affecting forest trees and timber, as well as ornamental and shade trees. The work is conducted in close cooperation with the Forest Service.

Scientific staff.—George G. Hedgcock and Perley Spaulding, pathologists; E. P. Meinecke, J. Franklin Collins, James R. Weir, William H. Long, and Carl P. Hartley, forest pathologists; Geo. F. Gravatt, C. J. Humphrey, and Nicholas R. Hunt, assistant pathologists; Roy G. Pierce, forest assistant; Ruby J. Tiller, John S. Boyce, and Ruth M. Fleming, scientific assistants.

Cotton and Truck Disease Investigations. W. A. ORTON, *Pathologist in charge.*

These investigations cover diseases of garden vegetables, including field demonstration of methods of control and prevention; diseases of cotton and of cowpeas and other forage crops.

Scientific staff.—H. A. Edson, F. J. Pritchard, and J. B. Norton, physiologists; L. P. Byars, I. E. Melhus, L. O. Kunkel, W. W. Gilbert, and L. L. Harter, pathologists; L. O. Watson and Venus W. Pool, assistant pathologists; O. A. Pratt, Ethel C. Tillotson, C. W. Carpenter, and M. B. McKay, scientific assistants.

Crop Physiology and Breeding Investigations. WALTER T. SWINGLE, *Physiologist in charge.*

This office investigates the physiology of crop plants with a view to determining the limiting factors which control their successful culture and the breeding and testing of new varieties. Several field stations are maintained. Field investigations are conducted on some of the Indian reservations of the Southwest for testing crop plants which seem likely to be suited for culture by the Indians and by white settlers in adjoining regions. Dates, Smyrna figs, hardy citrus fruits, pistaches, and certain drought-resistant tree crops are being tested.

Scientific staff.—S. C. Mason, arboriculturist; G. P. Rixford, physiologist; Maude Kellerman, botanical assistant; E. M. Savage, assistant plant breeder; Bruce Drummond and E. W. Hudson, assistants.

Soil Bacteriology Investigations. Directed by Assistant Chief of Bureau.

This work is a study of the relation of bacteria to soil fertility, plant growth, cellulose destruction, and the fixation of nitrogen. Pure cultures of nodule-forming bacteria for leguminous crops are distributed.

Scientific staff.—Felix Löhnis, soil biologist; Ira G. McBeth, physiologist; F. M. Scales, assistant soil mycologist; R. C. Wright, assistant physiologist; F. L. Goll, Lewis T. Leonard, and N. R. Smith, scientific assistants

Soil Fertility Investigations. OSWALD SCHREINER, *Biochemist in charge.*

This office studies the causes of and remedy for infertility in certain soils, whether natural or arising from improper methods of cultivation and cropping. It separates, identifies, and studies certain organic substances found in unproductive soils, and corrects their evil effects by mechanical handling, by the use of fertilizers, and by other methods available to the farmer.

Scientific staff.—Edmund C. Shorey, Bailey E. Brown, Joshua J. Skinner, Elbert C. Lathrop, biochemists; Alfred P. Dachnowski, physiologist; Fred R. Reid, Louis J. Gillespie, and Edward H. Walters, assistant biochemists; James H. Beattie and Henry Winkelmann, scientific assistants; Albert M. Jackson, laboratory aid.

Acclimatization and Adaptation of Crop Plants; Cotton Breeding. O. F. Cook, *Bionomist in charge.*

These investigations have special reference to the acclimatization in the South and Southwest of Central American varieties of cotton, corn, and other tropical crop plants. The breeding of cottons for the boll-weevil territory is a special feature.

Scientific staff.—G. N. Collins and H. Pittier, botanists; D. A. Saunders, plant breeder; P. V. Cardon, assistant agronomist; W. E. Townsend, assistant agriculturist; C. B. Doyle and R. M. Meade, scientific assistants; G. B. Gilbert, J. H. Kempton, C. G. Marshall, Guy S. Meloy, and Walton G. Wells, assistants in crop acclimatization.

Drug-Plant, Poisonous-Plant, Physiological, and Fermentation Investigations. RODNEY H. TRUE and W. W. STOCKBERGER, *Physiologists in charge.*

This branch of the bureau studies the commercial culture of drug-producing crops and tea; stock-poisoning plants and methods of preventing the losses caused by them; and plant physiology and fermentation.

Scientific staff.—A. B. Clawson, Heinrich Hasselbring, W. Van Fleet, and Lon A. Hawkins, physiologists; H. H. Bartlett, Otis F. Black, H. H. Bunzel, Frank Rabak, and A. F. Sievers, chemical biologists; S. L. Jodidi, organic chemist; W. W. Eggleston, assistant botanist; T. B. Young, assistant agronomist; S. C. Hood, E. H. Kellogg, and James Thompson, scientific assistants; G. Archie Russell, expert; James W. Kelly, laboratory technician.

Grain Standardization. J. W. T. DUVEL, *Technologist in charge.*

These investigations relate to the harvesting of grain and its proper preparation for market; its handling, storing, and grading on the farm, at country elevators, and in the terminal markets; and its handling by transportation companies. The purpose is to fix definite standards for the grading of grain, so as to encourage the use of improved methods of handling and storing grain, and the production of grain of better quality. This work is conducted at Washington, D. C., and at branch laboratories located at Baltimore, Md.; Chicago, Ill.; Decatur, Ill.; Fargo, N. Dak.; Kansas City, Mo.; New Orleans, La.; and Portland, Oreg.

Scientific staff.—E. G. Boerner, G. H. Baston, H. J. Besley, W. P. Carroll, C. L. Cannon, J. H. Cox, Laurel Duval, L. M. Jeffers, R. C. Miller, E. L. Morris, Philip Rothrock, C. A. Russell, L. M. Thomas, F. B. Wise, J. H. Shollenberger, L. J. Vandracek, and Malon Yoder, assistants; Stephen A. Ragan, scientific assistant.

Cereal Investigations. MARK ALFRED CARLETON, *Cerealist in charge.*

This work deals with the culture, adaptation, improvement, and uses of cereal crops, the prevention of diseases affecting cereals, the cultivation and breeding of flax for seed purposes, including a study of flax diseases, and the production and improvement of broom corn.

Scientific staff.—Carleton R. Ball, C. E. Chambliss, H. V. Harlan, C. E. Leighty, and C. W. Warburton, agronomists; Stephen Anthony, technologist in barley investigations; E. L. Adams, L. C. Aicher, C. H. Clark, J. Mitchell Jenkins, and F. A. Kiene, jr., assistant agronomists; H. B. Humphrey, pathologist; A. A. Potter, assistant pathologist; John F. Ross and D. E. Stephens, farm superintendents; F. R. Babcock, Ross R. Childs; J. A. Clark, N. C. Donaldson, A. D. Ellison, Victor H. Florell, G. H. Godfrey, J. W. Jones, J. H. Martin, J. D. Morrison, John H. Parker, B. E. Rothgeb, R. W. Smith, T. R. Stanton, and Louis Wermelskirchen, scientific assistants; G. A. McMurdo, and Clarence R. Letteer, assistants; L. R. Breithaupt, L. C. Burnett, W. T. Craig, A. G. Johnson, and F. J. Plemeisel, agents.

Corn Investigations. C. P. HARTLEY, *Physiologist in charge.*

These investigations are planned to determine the fundamental principles of corn improvement, adaptation, culture, and use that influence the quantity, quality, and profitability of corn production. They are conducted on the farms of interested corn growers throughout the United States and the facts determined support the educational work with corn as conducted by corn clubs and demonstration agents.

Scientific staff.—Ernest B. Brown, physiologist; Curtis H. Kyle, assistant physiologist; J. G. Willier, Fred D. Richey, George J. Burt, Henry M. Steece, H. Howard Biggar, E. S. Jenkins, and Charles D. Bennett, scientific assistants; J. M. Hammerly and H. S. Garrison, assistants.

Tobacco and Plant Nutrition Investigations. W. W. GARNER, *Physiologist in charge.*

The tobacco work has to do with the improvement of tobacco by hybridization and selection, the improvement of methods of growing and handling the crop, the combating of diseases, and the general study of the tobacco industry. Experiments and demonstrations in the growing of tobacco in rotation with farm crops are features of the work.

The plant-nutrition studies relate to some of the broad problems concerned in the growth and development of crop plants as affected by nutrition.

Scientific staff.—E. H. Mathewson and G. W. Harris, crop technologists; Otto Olson, E. G. Beinhart, D. E. Brown, W. M. Lunn, E. G. Moss, R. H. Milton, James P. Young, and James O. Evans, assistants in tobacco investigations; Charles W. Bacon and H. A. Allard, assistant physiologists; Charles L. Foubert, scientific assistant; Charles S. Ridgway, assistant in botanical laboratory work.

Agricultural Technology. N. A. COBB, *Technologist in charge.*

These investigations deal with the improvement of technological methods in crop production; the measurement of cotton staple, technological ginning investigations, and studies of plant-infesting nematodes.

Scientific staff.—W. E. Chambers, technologist; Albert Mann, plant morphologist; D. E. Earle, cotton technologist; William S. Dean, Thomas C. Adams, John J. W. Cooper, Clarence E. Colburn, Robert L. Kause, Clarence E. Killingsworth, Robert V. Hellams, Howard B. Richardson, assistants in agricultural technology; Emil G. Arzberger, pathologist; Alfred J. Steinberg, scientific assistant; John F. Barghausen, mechanical assistant.

Paper-Plant Investigations. Directed by C. J. BRAND, *Chief, Office of Markets and Rural Organization.*

This work has to do with the testing of plants believed to be suitable for paper manufacture.

Scientific staff.—Jason L. Merrill, assistant chemist; George A. Stuart, assistant in paper-plant investigations.

Fiber-Plant Investigations. L. H. DEWEY, *Botanist in charge.*

These investigations deal with the study of fiber plants likely to prove of value in the United States and the encouragement of fiber-plant industries.

Scientific staff.—Frank C. Miles, scientific assistant.

Biophysical Investigations. LYMAN J. BRIGGS, *Biophysicist in charge.*

This office studies physical problems connected with the work of the Bureau of Plant Industry. Attention is chiefly directed at present to biophysical problems in dry-land agriculture, the water requirements and nutrition of crop plants, the influence of the physical environment on crop growth, and investigations in electroculture.

Scientific staff.—C. A. Jensen, assistant in plant malnutrition; J. O. Belz, assistant; J. W. McLane and Julia R. Pearce, laboratory assistants; A. B. Campbell, mechanical assistant.

Seed-Testing Laboratories. EDGAR BROWN, *Botanist in charge.*

These laboratories examine samples of commercial seeds for the presence of adulteration and conduct a general propaganda in the interest of pure seed for the farmer. The work is performed both in Washington, D. C., and at cooperative laboratories in the field.

Scientific staff.—F. H. Hillman, assistant botanist; W. L. Goss, George T. Harrington, Emma F. Sirrine, Bertha C. Hite, Anna M. Lute, Norma Waddle, Helen M. Henry, Cora Jacobs, Etta O. Gilbert, Jessie A. Lee, Grace M. Cole, Rachel E. Holmes, Mary L. Stott, Emma S. Doyle, and Ethel M. Pattison, scientific assistants.

Forage Crop Investigations. CHARLES V. PIPER, *Agrostologist in charge.*

The forage crop investigations include methods of production; development and dissemination of new valuable varieties; extension of forage crops into sections where they are adapted but are grown only to a limited extent; and cooperation in the introduction and extension of new crops.

Scientific staff.—David Griffiths, agriculturist; R. A. Oakley, A. J. Pieters, H. N. Vinall, and Lyman Carrier, agronomists; Roland McKee, assistant agrostologist; Samuel M. Tracy, assistant agriculturist; M. W. Evans, W. J. Morse, A. B. Cron, H. R. Cates, Samuel Garver, R. W. Edwards, Robert E. Getty, L. W. Kephart, Leroy Moomaw, Harvey L. Westover, H. S. Coe, Hiram R. Reed, and Alma R. White, scientific assistants.

Alkali and Drought Resistant Plant Breeding Investigations. T. H. KEARNEY, *Physiologist in charge.*

This office investigates the alkali resistance of crop plants; develops, by breeding and selection, strains of field crops which will be more resistant to drought than the varieties now obtainable; and studies the physiology of drought resistance. The work is conducted in close cooperation with other branches of the bureau concerned with the upbuilding of agriculture in the West and Southwest.

Scientific staff.—H. I. Shantz and A. C. Dillman, physiologists; R. L. Piemeisel, and Florian A. Cajori, scientific assistants.

Economic and Systematic Botany. FREDERICK V. COVILLE, *Botanist in charge.*

This office maintains economic collections of cultivated plants and makes systematic studies of grasses and other economic plants, compiles information on native plants for publication, tests wild and little-known plants, and experiments with a view to the improvement of the grazing areas on the public lands.

Scientific staff.—A. S. Hitchcock, systematic agrostologist; W. E. Safford, economic botanist; P. L. Ricker and Ivar Tidestrom, assistant botanists; Agnes Chase, scientific assistant; Alice Henkel, assistant.

Dry-Land Agriculture Investigations. E. C. CHILCOTT, *Agriculturist in charge.*

This office studies proper cultural methods for the growing of crops in the semiarid regions of the West, especially in that portion known as the Great Plains area. The

objects are to determine the best methods of soil preparation and crop rotation for the conservation of moisture and the maintenance of humus in the soil.

Scientific staff.—J. S. Cole, W. W. Burr, traveling field assistants; W. A. Peterson, J. M. Stephens, O. J. Grace, W. D. Griggs, F. L. Kelso, J. E. Mundell, and E. F. Chilcott, farm superintendents; C. B. Brown, A. L. Hallsted, J. H. Jacobson, L. N. Jensen, O. R. Mathews, G. W. Morgan, A. J. Ogaard, W. M. Osborn, M. Pfaender, J. T. Sarvis, H. G. Smith, R. S. Towle, J. C. Thyssell, Leroy D. Willey, Joseph B. Kuska, and Arthur E. Seamans, assistants; L. L. Zook, physiologist; Chas. H. Ruzika, agent.

Western Irrigation Agriculture. C. S. SCOFIELD, *Agriculturist in charge.*

The work is concerned with the development of profitable agriculture on the lands to be placed under irrigation in the western United States, and also with the testing of various crops suited for growth under irrigation. The work is conducted in cooperation with a number of the investigational offices of the bureau.

Scientific staff.—F. B. Headley, assistant agriculturist; Beyer Aune, R. E. Blair, Daniel Hansen, S. H. Hastings, and Fritz Knorr, farm superintendents; J. A. Holden, C. E. Peterson, Ernest W. Curtis, and J. B. Wentz, assistants.

Sugar-Beet Investigations. C. O. TOWNSEND, *Pathologist in charge.*

This office investigates all phases of sugar-beet growing, including cultural methods, breeding, diseases, and all other limiting factors. It also studies the relation of the sugar-beet crop to all other activities on the farm, including crop rotation, stock raising, labor, markets, etc., so far as these factors have any bearing on the production of sugar beets; the culture and diseases of sugar cane with relation to the production of table sirup.

Scientific staff.—George F. Miles, pathologist; W. W. Tracy, jr., technologist; P. A. Yoder, sugar cane technologist; Wm. H. Burns, Samuel B. Nuckols, Joe G. Lill, and E. C. Rittue, assistants; L. E. Longley, scientific assistant; Julian K. Dale, junior, chemist.

Horticultural and Pomological Investigations. L. C. CORBETT, *Horticulturist in charge.*

These investigations are concerned with the improvement of methods of growing, handling, shipping, and sorting perishable fruits and truck and related crops; landscape and vegetable gardening; floriculture, and related subjects. The work is subdivided into fruit-utilization investigations; fruit transportation and storage investigations; fruit-production investigations; viticultural investigations; nut-culture investigations; pomological breeding investigations, including the improvement of fruits by bud selection; miscellaneous investigations bearing on the development of the fruit industry; truck-crop investigations; landscape-gardening, floriculture, and miscellaneous horticultural investigations; potato investigations; fruit-history investigations; fruit-nomenclature investigations; and fruit-identification investigations.

Scientific staff.—C. P. Close, H. P. Gould, George C. Husmann, E. R. Lake, C. W. Mann, and H. J. Ramsey, pomologists; A. D. Shamel, physiologist; S. J. Dennis, refrigeration technologist; D. N. Shoemaker, William Stuart, and H. C. Thompson, horticulturists; W. F. Wight, botanist; Chas. F. Clark, assistant agronomist; H. C. Gore, chemist; W. W. Tracy, sr., superintendent of testing gardens; F. L. Mulford, landscape gardener; H. M. Conolly and W. V. Shear, assistant horticulturists; C. S. Pomeroy and Leo Scott, assistant pomologists; C. A. Reed, nut culturist; C. G. Patten, expert; William E. Mosher, assistant in refrigeration; H. S. Bird, Hans J. Bock, Margaret Connor, George M. Darrow, Charles T. Dearing, George W. Dewey, C. L. Dyer, W. F. Fletcher, P. M. Lombard, Edward L. Markell, Fred E. Miller, W. C. Quick, V. W. Ridley, Elmer Snyder, Edw. D. Vosbury, D. D. Ward, scientific assistants; F. L. Husmann, viticultural superintendent.

Experimental Gardens and Grounds. E. M. BYRNES, *Assistant in charge.*

This office is charged with the care and ornamentation of the department grounds, the maintenance of greenhouses and plant collections, and the propagation of plants for experimental and other purposes. Experimental work with florists' crops is also being conducted in the greenhouses.

Congressional Seed Distribution.

This work consists of the securing, packeting, and mailing of the quantities of vegetable, flower, and other seeds and plants necessary for congressional distribution, as well as the testing, propagation, and distribution of improved seeds of various crops.

Staff.—R. A. Oakley, agronomist in charge; Oliver F. Jones, executive clerk; J. E. W. Tracy, assistant superintendent of testing gardens; H. E. Juenemann, in charge bulb-testing garden, Bellingham, Wash.; R. W. J. Vallentgold, plant propagator.

Foreign Seed and Plant Introduction. DAVID FAIRCHILD, *Agricultural Explorer in charge.*

This office secures promising new seeds and plants, both by agricultural exploration and by correspondence, and these are tested at the plant-introduction gardens or through cooperation with other offices, experiment stations, experimenters, and private individuals. Investigations in plant propagation and in the development of certain plant industries are features of the work.

Scientific staff.—P. H. Dorsett, plant introducer, in charge of plant-introduction field stations; Peter Bisset, plant introducer, in charge of foreign plant distribution; Frank N. Meyer and F. Wilson Popenoe, agricultural explorers; George W. Oliver, plant breeder and propagator; H. C. Skeels, Stephen C. Stuntz, and R. A. Young, botanical assistants; Allen M. Groves and Nathan Menderson, assistants in plant introduction; Glen P. Van Eseltine, assistant in botanical laboratory work; Robert L. Beagles, farm superintendent, in charge of plant-introduction field station, Chico, Cal.; Edward Simmonds, garden and field station superintendent, in charge of plant-introduction field station, Miami, Fla.; John M. Rankin, assistant farm superintendent, in charge of Yarrow plant-introduction field station, Rockville, Md.; Edward Goucher, plant propagator, at plant-introduction field station, Rockville, Md.; and Henry Klopfer, plant propagator, at plant-introduction field station, Chico, Cal.

Arlington Experimental Farm. Directed by L. C. CORBETT, *Horticulturist.*

The Arlington Farm is the field laboratory at Washington for the Bureau of Plant Industry, as well as for other bureaus of the department. Widely varying field tests are conducted on the farm.

Staff.—E. C. Butterfield, assistant horticulturist in general charge; J. H. Criswell, assistant superintendent.

Demonstrations on Reclamation Projects. F. D. FARRELL, *Agriculturist in charge.*

This office conducts demonstration work with individual farmers and farmers' organizations on the Government reclamation projects, for the purpose of assisting in the establishment of specific agricultural industries suited to the conditions on these projects.

Scientific staff.—L. E. Cline, Harry A. Ireland, Roy P. Bean, Carl Christopher, Don G. Magruder, and E. F. Rinehart, agriculturists; Charles S. Jones, assistant.

BUREAU OF CHEMISTRY.

Chief, CARL L. ALSBERG; *Assistant Chiefs,* R. L. EMERSON and W. P. JONES; F. B. LINTON, *Chief Clerk.*

The Bureau of Chemistry is concerned primarily with questions of agricultural chemistry of public interest, analytical work and investigations under the food and drugs act, and other chemical investigations referred to it by other branches of the Government service.

Detailed to Chief.—J. F. Brewster, L. H. Chernoff, C. Conover, A. S. Eastman, G. A. Geiger, C. O. Johns, H. E. Patten, E. E. Smith, and H. E. Woodward.

Office of General Administration. R. L. EMERSON, *Assistant Chief, in charge.*

A. S. Mitchell and S. H. Ross, administrative assistants; A. E. Draper, librarian; G. O. Savage, editor; J. G. Coleman and S. A. Postle, executive clerks.

State Cooperative Food and Drug Control. J. S. ABBOTT, *Chemist in charge.*

This office endeavors to promote close and cordial cooperation between State and Federal officials charged with the enforcement of all food and drug laws, works out policies for such cooperation, and seeks to unify and harmonize the work and policies of such officials.

Assistant.—H. S. Bailey.

Animal Physiological Chemical Laboratory. F. C. WEBER, *Chemist in charge.*

The work in this laboratory includes metabolism and feeding experiments with foods, organic and inorganic compounds, and various carbohydrates; a complete study of infant foods and of the application of chemical methods to the determination of deterioration of animal foods; investigations in the canning of sardines and other marine products; experiments on the destruction of fly larvæ in their breeding places; and experimental work to improve the methods of analysis ordinarily employed in physiological chemistry.

Scientific staff.—F. C. Cook, H. W. Houghton, and J. B. Wilson, assistants.

Carbohydrate Laboratory. C. S. HUDSON, *Chemist in charge.*

The laboratory analyzes sugars, sirups, molasses, honeys, jellies, jams, preserves, infant foods, confectionery, and similar substances in connection with the enforcement of the food and drugs act. Analyses are also made of all samples of sugars, starches, sirups, and molasses bought by the General Supply Committee. The laboratory investigates the manufacturing processes used in the production of raw and refined sugar and molasses, maple sugar, sirups from cane, maple, and sorghum, and confectionery and jellies. Improved

methods of chemical analysis are studied, and also the characteristic constants by which pure carbohydrates are distinguished.

Scientific staff.—D. H. Brauns, J. K. Dale, T. S. Harding, J. M. Johnson, S. F. Sherwood, M. N. Straughn, and E. Yanovsky, assistants.

Citrus By-Products Laboratory. E. M. CHACE, *Chemist in charge.*

This laboratory directs its attention to devising methods for the utilization of cull oranges and lemons. With this in view, methods are being studied for the manufacture of citric acid, oils of lemon and of orange, concentrated orange juice, and orange vinegar.

Scientific staff.—C. G. Church, R. H. Kellner, and C. P. Wilson, assistants.

Dairy Laboratory. G. E. PATRICK, *Chemist in charge.*

The dairy laboratory examines dairy products of every description and studies methods for making such examinations. A large part of the work at present is the examination of interstate samples of milk, butter, cheese, condensed milks, dried milks, malted milks, lactated foods, ice cream, and other dairy products to determine questions as to their adulteration and misbranding under the food and drugs act. Samples of imported dairy products are examined, and also samples of dairy products submitted by the General Supply Committee of the Government. Samples from other sources are analyzed when such work promises to be of public benefit.

Scientific staff.—O. L. Evenson, L. W. Ferris, and J. T. Keister, assistants.

Drug Division. L. F. KEBLER, *Chief.*

This division studies the properties, composition, and quality of drugs and medicinal preparations, and analyzes samples of such products taken in the enforcement of the food and drugs act. It also studies methods which may lead to more satisfactory analytical processes, especially for testing potent plant drugs and products derived from them.

Scientific staff.—V. K. Chesnut, W. S. Hubbard, T. C. Merrill, F. P. Morgan, H. J. Morgan, C. E. Parker, B. H. St. John. Drug-inspection laboratory: ——— chief; H. E. Buchbinder, E. C. Merrill, A. G. Murray, S. Palkin, assistants. Synthetic drug products laboratory: W. O. Emery, chief; G. C. Spencer, C. D. Wright, assistants. Essential oils laboratory: E. K. Nelson, chief.

Food Control Laboratory. H. M. LOOMIS, *Chemist in charge.*

The food control laboratory supervises the inspection of food products (not including cattle feeds or dairy products) under the food and drugs act. This work includes the examination of analytical reports on official food samples, the consideration of cases prepared for citation or prosecution, handling of correspondence relating to cases, and to general questions arising under the food and drugs act as they relate to these products. Special studies are also made of the manufacture and production of food products, including work on analytical methods for the examination of these products, particularly in collaboration with the Association of Official Agricultural Chemists.

Scientific staff.—M. Boyle, S. Coopersmith, C. O. Dodge, P. B. Dunbar, M. J. Ingle, H. A. Lepper, H. S. Paine, J. I. Palmore, E. L. P. Treuthardt, and H. J. Wichmann, assistants.

Food Investigation Laboratory. ———, *Chemist in charge.*

This laboratory conducts investigations that are necessary as a basis for the regulatory work in the food control. At the present moment the following problems are under investigation: The composition of American oils and fats; the effect of hydrogenation upon oils intended for use as food products; the composition of commercial generator vinegar and the changes taking place in the conversion of cider into vinegar; the exact determination of the heavy metals in foods; some essential oils and synthetic flavors and flavoring extracts prepared therefrom.

Scientific staff.—A. R. Albright, H. S. Bailey, R. W. Balcom, L. B. Burnett, W. D. Collins, E. G. Grab, G. A. Perkins, and A. E. Stevenson, assistants.

Fruit and Vegetable Utilization Laboratory. H. C. GORE, *Chemist in charge.*

This laboratory is investigating the utilization of culls and surplus fruits and vegetables. At present apples and potatoes are receiving the most attention. Much of this work is in cooperation with the Bureau of Plant Industry.

Scientific staff.—F. T. Anderson, R. H. Kent, and M. G. Mastin, assistants.

Grain Dust Explosion Investigations. D. J. PRICE, *Engineer in charge.*

Investigations are made of the causes of grain dust explosions in threshers, mills, and elevators with the view of determining the most effective means of preventing such explosions. The work is done in cooperation with the Office of Public Roads and Rural Engineering and the Bureau of Mines.

Scientific staff.—H. H. Brown, assistant.

Leather and Paper Laboratory. F. P. VEITCH, *Chemist in charge.*

This laboratory conducts investigations of tannins and tanning materials, their effects upon the strength and properties of leather, and processes involved in their production;

problems relating to the production of leather; the qualities of papers and their fitness for use in the Department of Agriculture and other departments of the Government which may request such investigations; the production of paper; the nature and uses of turpentine and resins, together with improved processes of production; the destructive distillation of wood and methods of improving the quality and quantity of the products. Turpentine and rosin are examined under the food and drugs act. Papers, leathers, turpentine, resins, and textiles are examined for the departments of the Government requesting such work, and specifications are prepared for the purchase of these articles.

Scientific staff.—M. G. Donk, R. W. Frey, V. E. Grotlisch, H. P. Holman, E. O. Reed, J. S. Rogers, C. F. Sammet, and C. F. Speh, assistants.

Microbiological Laboratory. CHARLES THOM, *Mycologist in charge.*

This laboratory consists of a research section and a regulatory section and works upon the relation of molds and bacteria to food products. Its research projects cover studies of yeasts, oysters, sauerkraut, canned goods, deterioration of cereal products and of forage, classification and activities of bacteria and molds, and the development and standardization of methods applicable to biological inspection work. Its regulatory staff conducts the bacteriological inspection of milk, oysters, gelatine, table waters, tomato products, canned foods, miscellaneous inspector's samples in which spoilage is suspected, and samples submitted by the Insecticide and Fungicide Board.

Scientific staff.—Research section: Charles Thom, mycologist in charge; V. Birchner, L. A. Round, and A. F. Schulze, assistants. Regulatory section: C. Bates, bacteriologist in charge; S. K. Farrar, E. Lefevre, Maud Mason Obst, R. W. Lamson, B. Schwartz, R. O. Webster, and L. P. Shippen, assistants.

Microchemical Laboratory. B. J. HOWARD, *Microscopist in charge.*

This laboratory makes microscopical and microchemical studies of foods, drugs, cattle feed, paper and textile materials, miscellaneous agricultural products, etc. It also makes microscopical examinations of insecticides, and studies methods for their microscopical identification and estimation. Special attention is given to the histological study of fruits, spices, cereals, starches, and other agricultural products for the purpose of perfecting methods for detecting the adulteration of these products.

Scientific staff.—G. L. Keenan, E. A. Read, B. H. Silberberg, and C. H. Stephenson, assistants.

Miscellaneous Division. J. K. HAYWOOD, *Chief.*

This division comprises the insecticide and fungicide laboratory, a cattle food and grain investigation laboratory, and a trade wastes laboratory, and studies insecticides and fungicides, cattle foods, forage crops, grains, trade wastes, and certain hygienic problems. making analyses under the food and drugs act and the insecticide act, and performing such miscellaneous chemical work as may be referred to it. This laboratory makes cooperative investigations of insecticides and fungicides for the Bureau of Entomology and Plant Industry and is engaged, with the latter bureau, in a number of cooperative studies of grain and forage crops. Much time is given to the investigation of new methods of analysis of insecticidal and fungicidal materials and to chemical investigations of insecticides and fungicides.

Scientific staff.—Insecticide and fungicide laboratory: C. C. McDonnell, chief; A. K. Balls, F. L. Elliott, J. J. T. Graham, E. L. Griffin, O. D. Knight, W. D. Lynch, W. J. Morgan, E. J. Nealon, W. B. Pope, R. C. Roark, C. M. Smith, C. H. Walker, and H. A. Whitman, assistants. Cattle food and grain investigation laboratory: G. L. Bidwell, chemist in charge; C. E. Goodrich, J. B. Reed, P. H. Waldruff, and G. P. Walton, assistants. Trade wastes laboratory: Under J. K. Haywood, chief.

Nitrogen Laboratory. T. C. TRESCOT, *Chemist in charge.*

Nitrogen determinations for all laboratories of this bureau, as well as for many of the other bureaus of the department, are made in the nitrogen laboratory. Work in cooperation with the Association of Official Agricultural Chemists is also done, looking to the improvement of the methods for making these determinations.

Organic Investigation Laboratory. I. K. PHELPS, *Chemist in charge.*

This laboratory is conducting investigations in organic chemistry necessary in the enforcement of the food and drugs act. The chief problem engaging it at present is the development of chemical methods for the detection of deterioration and spoilage in foods.

Scientific staff.—H. W. Daudt and H. E. Palmer, assistants.

Pharmacognosy Laboratory. A. VIEHOEYER, *Pharmacognosist in charge.*

This laboratory supervises the inspection of crude drugs under the food and drugs act. It investigates the chemical, physiological, and morphological characteristics of drugs and plants. It works on the improving of methods of drug analysis and on the establishing of standards for drugs and other plant products.

Scientific staff.—C. O. Ewing.

Pharmacological Laboratory. W. SALANT, *Pharmacologist in charge.*

This laboratory makes researches on the physiological action of poisonous substances occurring in food products and of drugs used as medicine, and physiological tests of drugs to ascertain the strength and purity of medicinal preparations found in the open market.

Scientific staff.—R. Bengis, A. E. Livingston, C. W. Mitchell, and L. E. Wise, assistants.

Plant Chemical Laboratory. J. A. LE CLERC, *Chemist in charge.*

The plant chemical laboratory studies the chemistry of plants, with respect especially to climate and environment, both in the greenhouse and in the field; changes taking place in grain during germination, malting, and storage; starch obtained from different sources for technical and food purposes; milling and breadmaking and the drying of potatoes. Work is also done in collaboration with the Bureau of Plant Industry on problems connected with plant physiological chemistry.

Scientific staff.—L. H. Pailey, J. F. Breazeale, J. Davidson, W. O. Gordon, H. A. Piper, and H. L. Wessling, assistants.

Water Laboratory. W. W. SKINNER, *Chemist in charge.*

This laboratory studies the composition of waters, brines, salts, and related products and analyzes samples of such products taken in the enforcement of the food and drugs act. It investigates sanitary problems relating to the production of bottled waters and technical problems in the purification of water, salt, etc.

Scientific staff.—W. F. Baughman, F. B. Furber, C. Huckle, and J. W. Sale, assistants.

Field Investigation Service.**Food Research Laboratory.** M. E. PENNINGTON, *in charge.*

The food research laboratory makes chemical, bacteriological, and histological studies of foods preserved by low temperatures. Milk, poultry, and eggs have been the objects of investigation, with reference to their decomposition and putridity during preparation, transportation, storage, and marketing, in connection with the food and drugs act. A special investigation of frozen and dried eggs and egg products has been carried on, chiefly in the egg-breaking establishments, and with the cooperation of the industry.

Scientific staff.—H. C. Albin, L. H. Almy, A. W. Broomell, E. D. Clark, E. L. Connolly, F. X. Daily, A. D. Greenlee, N. Hendrickson, J. S. Hepburn, M. Jenkins, H. A. McAleer, H. C. Pierce, C. M. Sherwood, H. L. Shrader, and E. Witmer, assistants.

Field Regulatory Service.**Food and Drug Inspection.**

The country has been divided into three food and drug inspection districts, Eastern, Central, and Western, each with a chief in charge, who has immediate supervision of the branch laboratories and the inspectors within his district. The eastern inspection district (W. G. Campbell,¹ Washington, D. C.) includes the laboratories in Boston (A. L. Sullivan²), Buffalo (L. Patton²), New York (R. E. Doolittle²), Philadelphia (C. S. Brinton²), San Juan (E. H. Grant²), Savannah (W. J. McGee²), and Washington (W. C. Taber³). The central inspection district (L. M. Tolman,¹ Chicago) includes the laboratories in Chicago (G. W. Hoover²), Cincinnati (L. B. Forst²), New Orleans (F. W. Liepsner²), St. Louis (D. B. Bisbee²), and St. Paul (E. H. Goodnow²). The western inspection district (B. R. Hart,¹ San Francisco) includes the laboratories in Denver (R. S. Hiltner²), Honolulu (A. W. Hansen²), San Francisco (R. W. Hilts²), and Seattle (A. L. Knisely²). There is a corps of 45 food and drug inspectors in the field. The taking of samples for analysis constitutes their chief duty, though special investigations in collaboration with the chemists are also made, and factories are inspected in which food and drugs are prepared. Examinations of samples are made for other branches of the Government service as may be necessary.

State Officials Authorized to Collect Samples Under the Food and Drugs Act.

Alabama.—J. A. Wade, Commissioner of Agriculture and Industries, Montgomery. *Arizona.*—Charles A. Meserve,⁴ Director of State Laboratory, University of Arizona, Tucson. *Arkansas.*—Morgan Smith, State health officer, Little Rock. *California.*—Martin Regensburger, State Board of Health, San Francisco. *Colorado.*—John Lynch, State Board of Health, Denver. *Connecticut.*—Frank H. Stadtmueller, Dairy and Food Commissioner, Capitol Building, Hartford. *Delaware.*—A. E. Frantz, State Board of Health, Wilmington. *District of Columbia.*—William C. Woodward, Health Department, Washington, D. C. *Florida.*—W. A. McRae, Commissioner of Agriculture, Tallahassee. *Georgia.*—J. D. Price,

¹ Chief.

² Chemist in charge.

³ Acting chemist in charge.

⁴ Authorized to collect sample by virtue of appointment as collaborating chemist.

Department of Agriculture, Atlanta. *Idaho*.—John K. White, Dairy, Food, and Sanitary Commissioner, Boise. *Illinois*.—W. Scott Matthews, Food Commission, 1627 Manhattan Building, Chicago. *Indiana*.—H. E. Barnard,¹ State Board of Health, Statehouse, Indianapolis; W. J. Jones, jr.,² Purdue University, Lafayette. *Iowa*.—W. B. Barney, Dairy and Food Commission, Des Moines. *Kansas*.—S. J. Crumline, State Board of Health, Topeka; L. A. Fitz,² State Agricultural College, Manhattan. *Kentucky*.—R. M. Allen, Food and Drug Department, Agricultural Experiment Station, Lexington. *Louisiana*.—Oscar Dowling, State Board of Health, New Orleans. *Maine*.—Wm. T. Guptill, Department of Agriculture, Augusta. *Massachusetts*.—Allan J. McLaughlin, Commissioner of Health, Boston; Philip H. Smith,² Agricultural Experiment Station, Amherst. *Michigan*.—James W. Helme, Dairy and Food Department, Lansing. *Minnesota*.—J. J. Farrell, Dairy and Food Department, St. Paul. *Mississippi*.—W. F. Hand,¹ Agricultural and Mechanical College, Agricultural College. *Missouri*.—F. H. Fricke, Food and Drug Department, La Salle Building, St. Louis. *Montana*.—W. F. Cogswell, Department of Public Health, Helena. *Nebraska*.—Clarence E. Harman, Food, Drug, Dairy, and Oil Commission, Lincoln. *Nevada*.—Sanford C. Dinsmore,¹ Agricultural Experiment Station, Reno. *New Hampshire*.—Irving A. Watson, State Board of Health, Concord. *New Jersey*.—R. B. Fitz-Randolph,¹ State Board of Health, Trenton. *New York*.—Chas. S. Wilson, Department of Agriculture, Albany. *North Carolina*.—W. A. Graham, Department of Agriculture, Raleigh. *North Dakota*.—Edwin F. Ladd,¹ Agricultural Experiment Station, Agricultural College. *Ohio*.—S. E. Strode, Dairy and Food Department, Columbus. *Oklahoma*.—John W. Duke, Commissioner, Department of Public Health, Oklahoma City; F. M. Gault,² Board of Agriculture, Oklahoma City. *Oregon*.—J. D. Mickle, Dairy and Food Commission, 510 Worcester Building, Portland. *Pennsylvania*.—James Foust, Department of Agriculture, Harrisburg. *Porto Rico*.—W. F. Lippitt, Service of Sanitation, P. O. Box 1108, San Juan. *Rhode Island*.—F. A. Jackson, Room 21, Statehouse, Providence. *South Carolina*.—E. J. Watson, Department of Agriculture, Commerce, and Industries, Statehouse, Columbia. *South Dakota*.—Guy G. Frary, Department of Food and Drugs, Vermilion. *Texas*.—R. H. Hoffman, jr., Food and Drug Department, Austin; B. Youngblood,² Agricultural Experiment Station, College Station. *Utah*.—Willard Hansen, Dairy and Food Department, 508 Walker Building, Salt Lake City. *Vermont*.—Charles F. Dalton, State Board of Health, 184 Church Street, Burlington. *Virginia*.—Benj. L. Purcell, Department of Agriculture and Immigration, Richmond. *Washington*.—J. J. Higgins, Department of Agriculture, Olympia. *Wisconsin*.—H. L. Russell,² Agricultural Experiment Station, Madison. *Wyoming*.—Maurice Groshon, Dairy, Food, and Oil Department, Cheyenne.

BUREAU OF SOILS.

Soil Physicist and Chief of Bureau, MILTON WHITNEY; *Chief Clerk*, A. G. RICE.

The Bureau of Soils investigates the relation of soils to climate and organic life; studies the texture and composition of soils in field and laboratory; maps the soils; studies the cause and means of preventing the rise of alkali in the soils of irrigated districts, and the relations of soils to seepage and drainage conditions.

The bureau prepares annually the report of the Field Operations of the Bureau of Soils, which contains a detailed description of the soils and of the agricultural conditions of the various areas surveyed, points out the present use of the soils, and discusses the possible changes and improvements in crops and methods of cultivation. Large-scale lithographic maps showing the distribution of the different kinds of soils accompany each report.

Laboratories. FRANK K. CAMERON, *Scientist in charge*.

The laboratories investigate the chemical properties of soils in their relation to plant growth; make chemical analysis of soil types and study their requirements with regard to fertilizers; investigate alkali problems; and direct the chemical methods used by field parties. Investigations are in progress regarding the occurrence and extent of natural deposits and of industrial by-products containing fertilizer constituents and the extraction and utilization of these constituents.

The laboratories also investigate the physical properties of soils and their economic bearing; make physical examination and mechanical analysis of soil types for soil-survey parties; prepare and test apparatus used in field work; and investigate from a physical standpoint such mechanical soil problems as arise.

Scientific staff.—J. W. Bomboy, H. Bryan, J. N. Carothers, C. J. Crawley, J. A. Cullen, R. O. E. Davis, C. C. Fletcher, Paul J. Fox, W. H. Fry, R. F. Gardiner, L. H. Greathouse,

¹ Authorized to collect sample by virtue of appointment as collaborating chemist.

² Authorized to collect samples of feeds and feeding stuffs.

Wm. Hasen, Sanders M. Johnson, Benjamin A. Judkins, C. B. Kernan, J. R. Lindemuth, A. R. Merz, C. F. Miller, W. J. O'Brien, L. B. Olmstead, W. B. Page, E. G. Parker, W. O. Robinson, W. H. Ross, J. P. Schroeder, J. G. Smith, L. A. Steinkoenig, J. W. Turrentine, and W. H. Waggaman.

Soil Survey. CURTIS F. MARBUT, *Scientist in charge.*

The Soil Survey surveys and maps the soils in selected areas in various parts of the United States; correlates the soils of different parts of the country and establishes their scientific classification; and locates, maps, and classifies the soils of agricultural-school farms and experiment-station farms, in cooperation with various State organizations.

Scientific staff.—Southern division, H. H. Bennett and W. E. Hearn. Northern division, W. E. McLendon and T. D. Rice. Western division, Macy H. Lapham. Use of soils, J. A. Bonsteel and J. E. Lapham, scientists.

J. H. Agee, R. T. Allen, Mark Baldwin, Miles W. Beck, R. T. A. Burke, R. R. Burn, T. M. Bushnell, W. T. Carter, jr., W. B. Cobb, L. V. Davis, E. B. Deeter, Bruce B. Derick, J. R. B. Dickey, J. E. Dunn, E. C. Eckmann, W. J. Geib, A. L. Goodman, E. C. Hall, R. B. Hardison, H. W. Hawker, L. C. Holmes, L. A. Hurst, F. Z. Hutton, G. B. Jones, R. C. Journey, J. A. Kerr, N. M. Kirk, A. E. Kocher, W. J. Latimer, H. G. Lewis, C. Lounsberry, E. T. Maxon, A. H. Meyer, C. N. Mooney, T. M. Morrison, A. L. Patrick, W. A. Rockie, R. F. Rogers, L. R. Schoenmann, E. H. Smies, H. C. Smith, W. G. Smith, J. M. Snyder, Edmund H. Stevens, A. T. Straborn, A. T. Sweet, A. E. Taylor, W. E. Tharp, B. W. Tillman, E. S. Vanatta, C. VanDuyne, J. O. Veatch, W. I. Watkins, E. B. Watson, R. A. Winston, and C. K. Yingling, assistants in the soil survey.

BUREAU OF ENTOMOLOGY.

Entomologist and Chief of Bureau, L. O. HOWARD; *Entomologist and Acting Chief of Bureau in absence of Chief*, C. L. MARLATT; *Chief Clerk and Executive Assistant*, E. B. O'LEARY; *Librarian*, MABEL COLCORD.

The Bureau of Entomology studies insects with special reference to methods of control, experiments with the introduction of beneficial insects, makes tests with insecticides and insecticide machinery, and identifies insects sent in by inquirers. Field laboratories are located throughout the country.

Investigations of Insects Affecting Southern Field Crops. W. D. HUNTER, *Entomological Assistant in charge.*

These investigations deal with insect pests of cotton, tobacco, sugar cane, and rice, and are planned to reveal practical methods of control. Special attention is given to the Mexican cotton-boll weevil and its parasitic enemies. An investigation of the Argentine ant is included.

Scientific staff.—W. D. Pierce, A. C. Morgan, J. L. Webb, T. E. Holloway, G. D. Smith, G. A. Runner, B. R. Coad, S. E. Crumb, J. D. Mitchell, and U. C. Loftin, entomological assistants; E. A. McGregor, E. R. Barber, R. W. Moreland, R. W. Howe, J. U. Gilmore, F. L. McDonough, and T. F. McGehee, scientific assistants.

Cereal and Forage Insect Investigations. F. M. WEBSTER, *Entomological Assistant in charge.*

The range caterpillar, the clover and alfalfa seed chalcis fly, wireworms, the corn leaf-aphis and the corn root-aphis, the alfalfa weevil, the fall army worm, the Hessian fly, the alfalfa gall midge, the Southern corn leaf-beetle, false wireworms, the alfalfa caterpillar, the chinch bug, white grubs, the western army cutworm, jointworms, the Southern corn rootworm, the cowpea curculio, and the clover and alfalfa root curculio are among the objects of these investigations. Seventeen field stations in cooperation with the farmer are distributed over the United States. Thus insects involved in the injury of all cereal and forage crops are investigated from an economic point of view throughout the entire area of distribution. In this way it is practicable to investigate any insect as affected by every variation of condition under which the farmer is obliged to contend with it in his own fields. Investigations are carried out as far as possible in the fields of the farmer, who is thus enabled to see what is being done.

Scientific staff.—G. I. Reeves, W. J. Phillips, J. A. Hyslop, E. O. G. Kelly, J. J. Davis, C. N. Ainslie, W. R. Walton, J. M. Aldrich, A. B. Gahan, V. L. Wildermuth, P. H. Timberlake, T. D. Urbahns, G. G. Ainslie, Philip Luginbill, R. N. Wilson, R. A. Vickery, H. E. Smith, Henry Fox, and P. B. Miles, entomological assistants; W. R. McConnell, C. W. Creel, E. H. Gibson, D. J. Caffrey, A. F. Satterthwait, L. P. Rockwood, T. R. Chamberlin, W. H. Larrimer, S. J. Snow, C. M. Packard, C. F. Turner, T. S. Wilson, A. H. Beyer, C. L. Scott, D. G. Tower, E. L. Barrett, W. T. Emery, F. H. Gates, C. C. Hill, W. E. Pennington, P. R. Myers, H. L. Parker, R. J. Kewley, L. J. Bower, G. W. Barber, J. S. Wade, L. J. Hogg, and J. M. Langston, scientific assistants.

Investigations of Insects Affecting Deciduous Fruits. A. L. QUAINANCE, *Entomological Assistant in charge.*

Insects injurious to orchards, vineyards, and nut trees are studied in this work. Field laboratories are maintained in important fruit-growing regions, as in Pennsylvania, Michigan, Colorado, New Mexico, California, and Washington State. Experiments in the use of insecticides and spraying apparatus are made. The important projects include: Investigations of apple insects, as the codling moth, apple borers, and apple plant-lice; investigations of peach insects, as the peach borer, plum curculio, etc.; investigations of grape insects, as the grape Phylloxera, grape-berry moth, and miscellaneous grape insects; and investigations of nut insects, as those affecting the pecan and chestnut. Other projects are: Cranberry and small-fruit insect investigations; investigations of orchard insecticides and spraying machinery; control of deciduous-fruit insects by natural agencies; and deciduous-fruit nursery insect investigations.

Scientific staff.—E. W. Scott,¹ F. E. Brooks, J. B. Gill, A. C. Baker, R. L. Nougaret, J. F. Strauss, R. A. Cushman, W. F. Turner, H. B. Scammell, E. B. Blakeslee, W. B. Wood, E. H. Siegler, J. H. Paine, and F. L. Simanton, entomological assistants; N. E. McIndoo, assistant in insect physiology; W. S. Abbott,¹ E. J. Newcomer, W. M. Davidson, A. J. Ackerman, R. J. Fiske, J. E. Dudley, jr.,¹ Dwight Isely, A. I. Fabis, H. J. Ingerson, H. K. Plank, and B. R. Leach, scientific assistants.

Investigations of Insects Affecting Tropical and Subtropical Fruits. C. L. MARLATT, *Entomologist and Acting Chief of Bureau in absence of Chief, in charge.*

Insects affecting all tropical and subtropical fruits are subjects of research, including those affecting the various species of citrus, olive, figs, etc., and greenhouse pests. The principal methods of control are investigated, namely, fumigation with hydrocyanic-acid gas, trapping, and spraying with contact and poison insecticides. The important projects include: Citrous-fruit insect investigations in California, citrous-fruit insect investigations in Florida, citrous-fruit insect investigations in Louisiana, investigations of insects affecting tropical and subtropical plants in greenhouses, and studies of miscellaneous subtropical insects.

Scientific staff.—R. S. Woglum, W. W. Yothers, and J. D. Neuls, entomological assistants; E. R. Sasscer, J. R. Horton, H. L. Sanford, E. W. Rust, and A. D. Borden, scientific assistants.

Investigations of the Mediterranean Fruit Fly. C. L. MARLATT, *Entomologist and Acting Chief of Bureau in absence of Chief, in charge.*

The life history of the fruit fly is studied in relation to its hosts, looking to means of control; the inspection and certification of pineapples and bananas for export from Hawaii to the mainland of the United States under Quarantine No. 13 and the general enforcement of this quarantine are attended to. Investigations of fruits likely to be imported into the United States from countries in which the fruit fly is known to occur are made as a basis for necessary quarantine and inspection of fruit entering the United States from such countries.

Scientific staff.—E. A. Back, entomological assistant; C. E. Pemberton, scientific assistant.

Truck Crop and Stored Product Insect Investigations. F. H. CHITTENDEN, *Entomologist in charge.*

Field studies of insects affecting vegetable and truck crops are being made in nine States. Projected work includes the control of wireworms and root-maggots, cutworms, and insects injurious to onion, sugar beet, cabbage, cauliflower, cucumber, melons, beans, and peas. Studies of mushroom insects are under way. Among stored products attacked by insects (such as grains, prepared cereals, seeds, dried fruits, nuts, meat products, and various fabrics), a special study is being made of export flour from the Gulf region, with similar work on insects introduced from South American and other foreign ports. New remedies for various pests are being tried.

Scientific staff.—C. H. Popenoe, T. H. Jones, M. M. High, F. A. Johnston, and D. E. Fink, entomological assistants; J. E. Graf, H. O. Marsh, F. B. Milliken, C. F. Stahl, Frank R. Cole, A. B. Duckett, B. L. Boyden, R. E. Campbell, W. H. White, and Pauline M. Johnson, scientific assistants; W. M. Dovener, expert.

Forest Insect Investigations. A. D. HOPKINS, *Forest Entomologist in charge.*

Investigations are conducted in the field and laboratory of the scientific and economic problems in connection with insects affecting forest, shade, and ornamental trees and hardy shrubs and forest products, with an ultimate view to the development and perfec-

¹ Employed in "Enforcement of Insecticide Act."

tion of practical methods of control and prevention. These investigations include studies of beneficial as well as destructive insects as they affect such trees and shrubs in life and in all subsequent stages of use. Permanent field stations are distributed in the principal forested areas of the country, to serve as headquarters and centers of their respective districts, for the investigation of local insect problems. Demonstrations of practical control methods are undertaken through correspondence with, or direct supervision of, private individuals or officers in charge of forests, wood lots, parks, or city shade trees and ornamental shrubs.

Scientific staff.—H. E. Burke (in charge of Pacific Slope Station at Placerville, Cal.), Josef Brunner (in charge of Northern Rocky Mountain Station at Missoula, Mont.), T. E. Snyder, W. D. Edmonston (in charge of Southern Rocky Mountain Station at Colorado Springs, Colo.), F. C. Craighead, J. M. Miller (in charge of seed insect station at Ashland, Oreg.), and A. B. Champlain, assistants in forest entomology; L. C. Griffith, assistant in shade-tree insects; S. A. Rohwer, specialist on forest Hymenoptera (in charge of Eastern Station at East Falls Church, Va.); A. G. Böving, specialist on coleopterous larvæ; C. T. Greene, specialist on forest Diptera; W. S. Fisher, specialist on forest Coleoptera; Carl Heinrich, specialist on forest Lepidoptera; Jacob Kotinsky and B. T. Harvey, entomological assistants; Joseph J. De Gryse, Mary C. Johnson, and William Middleton, scientific assistants.

Investigations of Insects Affecting the Health of Man and Animals. Under immediate direction of the Entomologist.

This field covers the relation between certain ticks and spotted fever, mosquitoes and malaria and yellow fever, and the house fly and typhoid fever. The investigations also deal with insects as internal and external parasites of animals and seek practical methods for their control. A number of pests affecting domestic animals, including the cattle tick, the stable fly, and the horn fly, are being studied.

Scientific staff.—D. L. Van Dine, F. C. Bishopp, A. H. Jennings, W. V. King, H. P. Wood, and D. C. Farman, entomological assistants; R. H. Hutchison, E. W. Laake, and W. E. Dove, scientific assistants.

Investigations in Bee Culture. E. F. PHILLIPS, *Apicultural Assistant in charge.*

The structure, development, and behavior of the bee are being investigated. Special attention is given to methods of wintering, with chief emphasis at present on the proper temperature of the bee cellar. Bee diseases are being thoroughly studied. The ultimate object is to furnish helpful information to the beekeeper.

Scientific staff.—G. S. Demuth and A. H. McCray, apicultural assistants; G. F. White and J. A. Nelson, experts.

Gipsy Moth and Brown-Tail Moth Investigations. A. F. BURGESS, *Entomological Assistant in charge.*

A large field force is maintained in New England in the work of preventing the spread of these two moths. A laboratory is maintained for the assemblage, study, and liberation of imported parasites of these moths; the work of the parasites is studied in the field. A quarantine is maintained and all products likely to carry these insects are inspected before they are shipped from the infested area.

Scientific staff.—D. M. Rogers, assistant in charge of gipsy-moth quarantine; L. H. Worthley, agent; C. H. T. Townsend, S. S. Crossman, C. W. Collins, F. H. Mosher, R. W. Glaser, Reginald Wooldridge, J. J. Culver, and C. W. Stockwell, entomological assistants; J. N. Summers, J. W. Chapman, J. B. Schaffner, jr., H. A. Preston, W. B. Turner, C. E. Hood, J. J. Pillsbury, H. W. Allen, R. T. Webber, D. W. Jones, and John W. Bradley, scientific assistants; G. E. Clement, Willis Munro, and O. D. Ingall, assistants in forest management.

Miscellaneous Investigations. Under immediate direction of the Entomologist.

The naming, classification, and establishment of the systematic relationships of all insects which are being studied in the various laboratories of the bureau, and the identification of similar material submitted by the agricultural experiment stations and by scientific workers, are included under this head.

Scientific staff.—August Busck, Rolla P. Currie, H. G. Dyar, Frederick Knab, and C. S. Menagh, entomological assistants; E. A. Schwarz, Nathan Banks, A. N. Caudell, H. S. Barber, Otto Heidemann, and Theodore Pergande, assistants; A. A. Giraùlt, expert on Chalcidoidea.

Editorial Office. ROLLA P. CURRIE, *Entomological Assistant in charge*; B. A. REYNOLDS, *Assistant.*

The editorial office attends to the editing of manuscripts, the reading of proofs of publications and other printed matter, the preparation of indexes and abstracts, correspondence relating to manuscripts, proofs, and publications, and other work of a similar nature.

BUREAU OF BIOLOGICAL SURVEY.

Chief, HENRY W. HENSHAW; Assistant Chief, E. W. NELSON.

The work of the Bureau of Biological Survey is distributed among four divisions, dealing with the following matters: (1) Study of birds and mammals in their relation to agriculture, their food habits, etc., and recommendation of measures for the preservation of beneficial species and the destruction of harmful species; A. K. Fisher, in charge. (2) Making biological surveys, study of geographic distribution of animals and plants, and mapping natural life zones; E. W. Nelson, in charge. (3) Carrying into effect the Federal laws protecting game, regulating the importation of foreign birds and mammals, and supervising game and bird reservations; T. S. Palmer, in charge. (4) Enforcing the regulations under the Federal migratory bird law; J. E. Mercer, in charge.

DIVISION OF ACCOUNTS AND DISBURSEMENTS.

Chief of Division and Disbursing Clerk, A. ZAPPONE.

This division has charge of the disbursement of public funds appropriated for the Department of Agriculture.

Cashier's Section. W. J. NEVIUS, *Cashier and Chief Clerk, in charge.*

This section prepares and mails all checks and handles all moneys received and disbursed.

Bookkeeper's Section. F. W. LEGGE, *Accountant and Bookkeeper, in charge.*

This section keeps the books pertaining to the fiscal affairs of the department, prepares requisitions on the Treasury for advance of public funds, and compiles quarterly abstracts of expenditures and collections and an account current covering the liability for public funds.

Examining Section. EVERETT D. YERBY, *Supervising Auditor, in charge.*

This section examines all accounts before payment.

Miscellaneous Section. W. R. FUCHS, *Deputy Disbursing Clerk, in charge.*

This section handles the vouchers in connection with the Weeks Forestry Law and performs miscellaneous work not assigned to other sections.

DIVISION OF PUBLICATIONS.

Editor and Chief, JOS. A. ARNOLD; Editor and Assistant Chief, B. D. STALLINGS; Chief Clerk, A. I. MUDD.

The Division of Publications conducts all business of the department transacted with the Government Printing Office; has general supervision of all printing, including the editing, indexing, illustration, binding, and distribution of publications, and the maintenance of mailing lists.

Editorial Work. B. D. STALLINGS, *Editor and Assistant Chief, in charge.*

This work includes editing manuscripts and giving directions for printing, correcting proofs, and inspecting completed work.

Editorial corps.—R. B. Handy, Ephraim Cornman, William F. Harding, George W. Kennedy, Stanley Searles, T. K. Burrows, Delos M. Carter, and R. S. Moore, assistant editors.

Indexing. CHARLES H. GREATHOUSE, *Assistant Editor in charge.*

Two kinds of indexes are made: (1) Indexes to be printed with individual publications; (2) a general card index, by subjects, of all publications of the department. Congressional documents are obtained for department officials, and the Congressional Record is marked daily for their attention.

Illustrations. A. B. BOETTCHER, *Assistant in charge.*

Drawings and photographs are made for use in illustrating publications and also for use in the various branches of the department's work. Photographic prints and lantern slides are sold to the public.

Document Section. FRANCIS J. P. CLEARY, *Assistant in charge.*

This section receives and distributes the publications designed for departmental use; mails circulars and documents not intended for public distribution; furnishes mailing lists and makes orders upon the Public Printer for the mailing of publications intended for the public; specifies the publications to be sent in response to miscellaneous requests; prepares correspondence relating to the publications and keeps all records of the distribution, including the Congressional quotas of Farmers' Bulletins; addresses franks and envelopes, and prepares addresses for mailing lists, of which a general index is kept up to date; and duplicates official circulars, as well as the information prepared for the press.

BUREAU OF CROP ESTIMATES.

Statistician and Chief of Bureau, LEON M. ESTABROOK; *Assistant Statistician*, NAT C. MURRAY; *Chief of Division of Crop Reports*, SAMUEL A. JONES; *Chief of Division of Crop Records*, FRANK ANDREWS; *Chief Clerk*, ORVILLE N. FANSLER.

The Bureau of Crop Estimates (formerly Bureau of Statistics) issues the monthly crop reports of the department, prepares the statistical portion of the Yearbook of the Department of Agriculture, and makes special investigations relating to agricultural forecasts and estimates for publication or in response to special inquiries.

Crop Reporting Board.

Monthly crop estimates for important crops are made by a Crop Reporting Board, consisting of the chief of bureau, as chairman, and four other members selected from the officials and agents of the bureau. The estimates are based mostly on reports from three independent sources, namely, (1) field agents, (2) county correspondents, and (3) township correspondents; of the latter there are many thousands. Special lists of correspondents are maintained for special inquiries.

Division of Crop Reports.

The Division of Crop Reports receives the reports of the various classes of crop correspondents and tabulates them for the use of the Crop Reporting Board. The reports of correspondents are sent in on blank schedules furnished them by this division, which also keeps the ranks of the correspondents filled up.

Field Service.

The service outside of Washington consists of 43 field agents and about 150,000 voluntary correspondents. The field agents keep in touch with the best-informed opinion throughout their districts, by travel and by maintenance of special corps of correspondents.

Division of Crop Records.

The Division of Crop Records collates agricultural statistics from various official and unofficial records. The statistical portion of the Yearbook is prepared here. A well-equipped library of agricultural statistics is maintained.

LIBRARY.

Librarian, CLARIBEL R. BARNETT; *Assistant Librarian*, EMMA B. HAWKS.

The department library, consisting of the main library and the various bureau, division, and office libraries, contains approximately 133,000 books and pamphlets, including an extensive collection on agriculture and all its branches, a large and representative collection on the sciences related to agriculture, and a good collection of standard reference books. In addition to the department use, books are lent to college and experiment station libraries and other institutions for use in connection with the researches of these institutions. Periodicals currently received number 2,128. A dictionary card catalogue is maintained consisting of about 310,000 cards. The librarian has charge of the foreign mailing lists for department publications.

STATES RELATIONS SERVICE.

Director, A. C. TRUE.

The States Relations Service represents the Secretary of Agriculture in his relations with the State agricultural colleges and experiment stations under the acts of Congress granting funds to these institutions for agricultural experiment stations and cooperative extension work in agriculture and home economics, and in carrying out the provisions of acts of Congress making appropriations to this department for farmers' cooperative demonstration work, investigations relating to agricultural schools, farmers' institutes and home economics, and the maintenance of agricultural experiment stations in Alaska, Hawaii, Porto Rico, and Guam.

Office of the Director.

EUGENE MERRITT, *Administrative Assistant*; Mrs. C. E. JOHNSTON, *Chief Clerk*; F. E. SINGLETON, *Chief Accountant*; Miss E. L. OGDEN, *Librarian*.

Editorial Division. W. H. BEAL, *Chief*.

This division edits and prepares for printing all publications of the States Relations Service except the Experiment Station Record; cooperates with the Division of Publications in maintaining mailing lists and in the distribution of publications of the service; and has charge of lantern slides and other illustrative material.

Investigations on Agricultural Instruction in Schools. C. H. LANE, *Chief Specialist in Agricultural Education*.

These investigations include studies of the methods and subject matter of school instruction in agriculture in this and other countries, with a view to determining the needs of such instruction in order to make it practically useful to students who are to become

farmers or workers in agricultural institutions, and to furnish schools with up-to-date and properly organized subject matter and illustrative materials in the various branches of agriculture, to supplement and reinforce textbooks and field practices.

Investigations on Farmers' Institutes and Movable Schools. J. M. STEDMAN, *Farmers' Institute Specialist*.

These investigations include studies on farmers' institutes, movable agricultural schools, and similar organizations carried on in this and other countries, especially with a view to devising and experimenting with modified or new methods adapted to conditions in the United States, and to providing farmers' institute and extension workers with publications and illustrative material especially adapted to their needs.

Office of Experiment Stations.

E. W. ALLEN, *Chief*, and *Editor of Experiment Station Record*.

Relations with Institutions for Agricultural Research.

Under this head the office is broadly organized to give the State agricultural experiment stations such advice and assistance as will best promote their efficiency. It also collects and disseminates information regarding similar institutions throughout the world. Among its activities in relation to the stations are the following:

Inspection of work and expenditures of the State experiment stations.—The office supervises the expenditures of the Federal funds granted to the State agricultural experiment stations under the acts of Congress of March 2, 1887, and March 16, 1896. This work is assigned especially to the Chief and W. H. Beal, Walter H. Evans, J. I. Schulte, and E. V. Wilcox.

Experiment Station Record.—The office publishes *Experiment Station Record*, a periodical which gives abstracts of the bulletins and annual reports of the experiment stations, of the publications of the Department of Agriculture, and of publications reporting investigations in agricultural science in the different countries of the world. The Record also contains editorials and notes bearing upon station work. The staff of the Record is as follows: Assistant editor, H. L. Knight; agricultural chemistry and agrotechny, ———; meteorology, soils, and fertilizers, W. H. Beal and R. W. Trullinger; agricultural botany, bacteriology, and plant pathology, W. H. Evans and W. E. Boyd; field crops, G. M. Tucker; horticulture and forestry, E. J. Glasson; foods and human nutrition, C. F. Langworthy, H. L. Lang, and C. F. Walton, jr.; zootechny, dairying, and dairy farming, Hugh Webster; economic zoology and entomology, W. A. Hooker; veterinary medicine, W. A. Hooker and ———; rural engineering, R. W. Trullinger; rural economics, Eugene Merritt; agricultural education, C. H. Lane; indexes, M. D. Moore.

Division of Insular Experiment Stations. WALTER H. EVANS, *Chief*.

The experiment stations in Alaska, Hawaii, Porto Rico, and Guam are conducted under the general direction of this division.

Alaska Agricultural Experiment Stations. C. C. GEORGESON, Sitka, *Agroñomist in charge*.

The main station in Alaska is at Sitka. Investigations are also carried on at Rampart, in the Yukon Valley; at Kodiak; and at Fairbanks, in the valley of the Tanana River. The work consists of field experiments with vegetables, cereals, and forage plants; horticultural investigations; the maintenance of live stock; the curing of hay and silage; the distribution of seeds; and an agricultural survey of the Territory.

Staff.—J. P. Anderson, horticulturist. Sitka; G. W. Gasser, assistant in charge, Rampart; T. D. Crippen, plant breeder, Rampart; M. D. Snodgrass, assistant in charge, Kodiak; J. W. Neal, assistant in charge, Fairbanks.

Hawaii Agricultural Experiment Station. J. M. WESTGATE, Honolulu, *Agronomist in charge*.

The activities of this station are concerned with cotton, rice, forage crops, fiber, and horticultural plants, with soils, plant diseases, insects, and extension work. In cooperation with the Hawaiian Government, a demonstration farm is maintained on the Island of Hawaii, and a marketing division in Honolulu.

Staff.———, entomologist; J. E. Higgins, horticulturist; V. S. Holt, assistant horticulturist; M. O. Johnson, chemist; Alice R. Thompson, assistant chemist; J. B. Thompson, assistant agronomist; C. A. Sahr, assistant in agronomy; F. G. Krauss, superintendent of extension work; A. T. Longley, in charge of cooperative marketing investigations.

Porto Rico Agricultural Experiment Station. D. W. MAY, Mayaguez, *Agronomist in charge*.

Investigations of this station relate especially to the growing of coffee, field crops, and horticultural plants, the development of animal husbandry and dairying, soils, vegetable pathology, and entomology.

Staff.—P. L. Gile, chemist; J. O. Carrero, assistant chemist; C. F. Kinman, horticulturist; T. B. McClelland, assistant horticulturist; R. H. Van Zwaluwenburg, entomologist.

Guam Agricultural Experiment Station. A. C. HARTENBOWER, Guam, *Agronomist in charge.*

The station in Guam is located near Agana, the principal town. Experiments are being conducted in improved methods of cultivation, introduction and improvement of tropical agricultural crops, and introduction of improved live stock.

Staff.—L. B. Barber, veterinarian and animal husbandman; P. Nelson, assistant.

Office of Extension Work in the South.

BRADFORD KNAPP, *Chief.*

Relations with Extension Divisions of Agricultural Colleges in 15 Southern States.

Under this head the office cooperates with the extension divisions of the State agricultural colleges within its territory in their extension work in agriculture and home economics, and supervises their work and expenditures under the act of Congress of May 8, 1914. It also acts as an agency for coordinating the extension work of the several bureaus of the department with similar work carried on by the agricultural colleges.

Farmers' Cooperative Demonstration Work.

Under this head extension and demonstration work on all subjects relating to agriculture, home economics, and rural life generally is carried on through practical demonstrations and instruction under the supervision and management of State, district, and county agents working with individuals and through organizations of farm men and women and boys' and girls' clubs. This work is supported by direct congressional appropriation to the department, but is done in cooperation with State colleges of agriculture, departments of agriculture and education, county governments and organizations, and others. In the cotton territory the work includes the teaching and demonstration of methods of meeting the ravages of the cotton-boll weevil.

States.—Texas, Oklahoma, Louisiana, Arkansas, Tennessee, Mississippi, Alabama, Georgia, Florida, South Carolina, North Carolina, Virginia, Maryland, West Virginia, and Kentucky.

Scientific staff.—County agent work: J. A. Evans, agriculturist in general charge and assistant field agent for Oklahoma, Texas, Mississippi, Alabama, South Carolina, Georgia, and Florida; W. B. Mercier, agriculturist and field agent for Arkansas, Louisiana, Tennessee, and North Carolina; H. E. Savely, agriculturist and field agent for Oklahoma, Texas, Mississippi, Alabama, South Carolina, Georgia, and Florida; Jesse M. Jones, agriculturist and field agent for Kentucky, Maryland, Virginia, and West Virginia. Boys' and girls' club work: O. B. Martin, agriculturist in general charge; I. W. Hill, assistant in boys' club work; Mary E. Creswell and Ola Powell, assistants in home demonstration and girls' club work; H. W. Barber, assistant.

Field extension staff.—County agent and boys' club work (men agents): 15 State agents, 18 assistant State agents, 44 district agents, 687 county agents, 49 local agents. Home demonstration and girls' club work (women agents): 15 State agents, 10 assistant State agents, 4 district agents, 349 county agents, 2 local agents. Total, 1,193.

Office of Extension Work in the North and West.

C. B. SMITH, *Chief.*

Relations with Extension Divisions of Agricultural Colleges in 33 Northern and Western States.

Under this head the office cooperates with the extension divisions of the State agricultural colleges within its territory in their extension work in agriculture and home economics, and supervises their work and expenditures under the act of Congress of May 8, 1914. It also acts as an agency for coordinating the extension work of the several bureaus of the department with similar work carried on by the agricultural colleges.

Farmers' Cooperative Demonstration Work.

Under this head extension and demonstration work on all subjects relating to agriculture, home economics, and rural life generally is carried on through practical demonstrations and instruction under the supervision and management of State, district, and county agents working through organizations of farm men and women and boys' and girls' clubs. This work is in cooperation with State colleges of agriculture, departments of agriculture and education, county governments and organizations, and others. Demonstrations in farm management form a special line of work.

States.—Arizona, California, Colorado, Connecticut, Delaware, Idaho, Illinois, Indiana, Iowa, Kansas, Maine, Massachusetts, Michigan, Minnesota, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Dakota, Ohio, Ore-

gon, Pennsylvania, Rhode Island, South Dakota, Utah, Vermont, Washington, Wisconsin, Wyoming.

Scientific staff.—County agent work: L. A. Clinton, agriculturist in general charge and in immediate charge of county agent work in the Eastern States; H. J. Wilder, assistant; W. A. Lloyd, agriculturist in charge in the North Central States; H. B. Fuller, assistant; D. W. Working, agriculturist in charge in the Western States; H. W. Gilbertson, assistant. Boys' and girls' club work: O. H. Benson, agriculturist in charge; George E. Farrell, assistant. Farm management demonstrations: L. H. Goddard, agriculturist in charge; E. A. Brown, assistant; J. A. Liggett, executive assistant.

Field extension staff.—County agent work: 30 State leaders, 14 assistant State leaders, 344 county agents. Boys' and girls' club work: 21 State leaders, 20 assistant State leaders. Farm management demonstrations: 20 State demonstrators.

Office of Home Economics.

C. F. LANGWORTHY, *Chief*; R. D. MILNER, *Assistant*.

Studies of Food, Dietetics, Clothing, and Household Equipment, Work, and Management.

This work includes scientific and practical studies of the nature and uses of agricultural products used in the home for food, clothing, and equipment, and the methods of household work and management, and makes available to housekeepers, teachers, students, and extension workers the results of such studies at home and abroad.

Respiration Calorimeter Investigations.

This work includes a systematic study by special calorimetric methods of food, clothing, and household equipment and work with special reference to energy values and efficiency. Special calorimeter investigations on other subjects included within the work of the department are carried on in cooperation with the different bureaus.

Scientific staff.—S. C. Clark, W. P. Garrety, A. D. Holmes, H. L. Lang, Anna H. Whittelsey, C. F. Walton, jr., J. P. Andrew, Ilena M. Bailey, Caroline L. Hunt, and Helen W. Atwater, assistants in investigations.

OFFICE OF PUBLIC ROADS AND RURAL ENGINEERING.

Director, LOGAN WALLER PAGE; *Assistant Director*, P. ST. J. WILSON; *Chief Clerk*, W. CARL WYATT; *Executive Clerk*, W. J. O'LEARY; *Editorial Clerk*, A. L. DAVIES; *Librarian*, GRACE FRANCIS.

The Office of Public Roads and Rural Engineering studies systems of road management and methods of road building, road improvement, and road maintenance; details engineers to assist local officials in building model roads; ascertains the location, properties, and value of road materials; builds experimental roads to devise and test new methods and materials for road construction; investigates the comparative effects of motor and horse-drawn traffic on roads; cooperates with colleges and stations and with State highway officials; exhibits models showing types of roads, culverts, bridges, and road machines; and cooperates with the Post Office Department in carrying out the provisions of the Post Office appropriation act of August 24, 1912, relating to the improvement of post roads, and with the Forest Service on road work done with the proceeds of the 10 per cent appropriation from their receipts; and cooperates with the Department of the Interior in the improvement of roads in the national parks; investigates and reports concerning the best methods of utilization of water in farm irrigation, and concerning the development of the most efficient equipment for farm irrigation; inquires into all studies of duty, apportionment, and measurement of irrigation water, and into the customs, regulations, and laws affecting irrigation; renders expert advice and assistance in farm irrigation; investigates and reports upon the drainage of farms, and of swamp and other wet lands otherwise available for agriculture; conducts field experiments and investigations in regard to construction and equipment in farm drainage systems; renders expert advice and assistance in farm drainage; investigates the domestic water supply and drainage disposal of the farm; renders expert advice in construction of farm buildings, farm machinery, and in other rural engineering problems.

Road Management Investigations. J. E. PENNYBACKER, *Chief of Road Economics, in charge*.

This work covers general statistical and research investigations; the economic study of highway systems; studies of road cost accounting; compilation and advice upon road legislation; traffic census statistics and analyses; lectures and demonstration by road and bridge models and by moving pictures, slides, and photographs; the maintenance of a State index containing information in concise form with reference to road matters throughout the United States; the employment of a corps of State collaborators, one in each State; studies of convict labor applied to highway work; and the giving of expert advice in line with the foregoing projects.

Scientific staff.—M. O. Eldridge, L. E. Boykin, and James J. Tobin, assistants in road economics; A. S. Brainard, senior highway engineer; A. P. Anderson, Earl H. Barber, R. F. Eastham, and H. S. Fairbank, highway engineers; George D. Marshall, superintendent of road construction; H. W. Hendley, model maker.

Road Building and Maintenance Investigations. P. ST. J. WILSON, *Assistant Director, in charge*; and VERNON M. PEIRCE, *Chief of Road Construction*; E. W. JAMES, *Chief of Road Maintenance*; T. WARREN ALLEN, *Chief of National Park and Forest Roads*; OSCAR L. GROVER, *Bridge Engineer*.

These investigations cover the building of object-lesson and post roads, and object-lesson bridges; the development of county road systems; making inspections and giving expert advice on road and bridge construction; the superintendence of county roads; the making of road surveys; systems of road maintenance; the maintenance of object lesson, experimental, and post roads; conducting object lessons in road maintenance; the construction of roads within the National Parks and National Forests, in cooperation with the Department of the Interior and with the Forest Service; the preparation of typical plans for highway bridges and culverts; and experiments with bridge materials.

Scientific staff.—H. L. Arbenz, B. H. Burrell, W. F. Brooks, W. A. Crossland, O. W. Childs, J. D. Fauntleroy, B. F. Finch, E. O. Hathaway, B. F. Heidel, L. I. Hewes, C. H. Kendall, H. H. Lotter, W. H. Lynch, C. H. Moorefield, G. C. Scales, J. F. Schuyler, W. L. Spoon, C. H. Sweetser, R. E. Toms, J. T. Voshell, J. A. Whitaker, and J. C. Wonders, senior highway engineers; H. K. Craig, J. W. Janssen, C. C. Morris, A. E. Palen, O. N. Powell, W. H. Rhodes, jr., W. E. Rosengarten, C. R. Thomas, V. E. Towles, W. J. R. Weir, and M. E. Worrel, highway engineers; E. S. Alderman, J. W. Ball, F. A. Davis, A. C. Dunn, Mack Galbreath, L. S. Hall, R. H. Harrison, A. S. Hathaway, jr., A. L. Hooper, F. R. Lyons, H. S. Parry, J. T. Pauls, T. C. Petersen, P. A. Rideout, R. E. Royall, S. L. Taylor, and L. L. Winans, junior highway engineers; J. H. Dodge, J. H. Eldridge, D. G. Haire, C. T. Harrison, H. C. Wells, and D. H. Winslow, superintendents of road construction; Leonard W. Erickson, highway bridge engineer; T. L. Ainsworth, engineer draftsman; O. P. Solem, draftsman.

Road Materials Tests and Research. PRÉVOST HUBBARD, *Chemical Engineer, in charge of physical and chemical laboratories*.

These investigations cover the routine chemical testing and inspecting of dust preventives and road binders and materials allied to road construction; microscopic examination and classification of road-building rocks; research on properties of dust preventives and road binders; standardization of methods of testing bituminous road materials, experimental bituminous road construction and maintenance; physical testing of road-building materials; nonbituminous road material investigations; standardization of tests on nonbituminous road materials.

Scientific staff.—Chemical laboratories: C. S. Reeve, chemist; E. C. E. Lord, petrographer; F. P. Pritchard, B. A. Anderton, and R. H. Lewis, assistant chemists; Benjamin Kamrass, aid, qualified in chemistry. Physical laboratories: F. H. Jackson, jr., assistant testing engineer; M. R. Walton, laboratory apprentice.

Field Experiments. P. ST. J. WILSON, *Assistant Director*, and VERNON M. PEIRCE, *Chief of Road Construction, in charge of road construction*; and E. B. MCCORMICK, *Mechanical Engineer, in charge of traction tests*.

This work comprises the construction of experimental roads in cooperation with local administrative units for the purpose of demonstrating the best methods of constructing new types of roads and of studying the effect upon these roads of traffic under known conditions; investigations concerning various road materials and preparations; investigating and developing equipment intended for the preparation and application of bituminous and other binders; and the conduct of traction tests in order to determine the respective resistance of various road surfaces, and the relative values of wide and narrow tires, of different diameters of wheels, width of tread, together with the effect of grade and method of hitching on the effort that may be exerted by horses; also to determine the effect both on the draft required and on the road surface of increasing the load beyond certain limits.

Scientific staff.—Various members of the force of highway engineers, mechanical engineers, chemists, and student assistants in the office.

Investigations of Rural Engineering Problems and Farm Structures.

E. B. MCCORMICK, *Mechanical Engineer, in charge*.

These investigations involve the study of the domestic water supply and disposal of sewage, on the farm; recommendations and plans for farm buildings, with reference to convenience and economy; research, cooperative, and experimental demonstrations of rural problems involving an expert knowledge of mechanical principles; investigations of

concrete roads and bridges, and other concrete structures involved in rural improvements; and instrument making and repairing.

Scientific staff.—Earl B. Smith, associate mechanical engineer; L. L. Beebe, Morgan Cilley, A. M. Daniels, and Elmer Johnson, assistant mechanical engineers; George M. Warren, drainage engineer; Wallace Ashby, M. C. Betts, and W. A. Etherton, farm architects; E. C. Glascock, instrument maker.

Irrigation Investigations. P. ST. J. WILSON, *Assistant Director, in charge*; and SAMUEL FORTIER, *Chief of Irrigation Investigations*.

These investigations include the following subjects: Utilization of water in farm irrigation; pumping for irrigation; irrigation appliances and equipment; flow of water in ditches, pipes, and other conduits; measurement of water; customs, regulations, and laws relating to irrigation; expert advice and assistance.

Scientific staff.—R. P. Teele, irrigation economist; Paul A. Ewing, executive assistant; Frank Huntington, editorial clerk; Frank Adams, W. L. Rockwell, irrigation managers; S. H. Beckett, F. L. Bixby, V. M. Cone, H. C. Diesem, P. E. Fuller, W. B. Gregory, H. W. Grunsky, C. G. Haskell, F. G. Harden, S. T. Harding, J. T. Kingdon, W. W. McLaughlin, R. D. Robertson, Fred C. Scobey, F. W. Stanley, C. E. Tait, Milo B. Williams, irrigation engineers; Paul S. Jones, James C. Marr, Reuben B. Sleight, and Frank J. Veihmeyer, assistant irrigation engineers; Earl Beck, L. M. Winsor, agents; E. J. Hoff, mechanician; R. G. Hemphill, John H. Gordon, irrigation farmers.

Drainage Investigations. P. ST. J. WILSON, *Assistant Director, in charge*; and S. H. McCROY, *Chief of Drainage Investigations*.

These investigations embrace the following subjects: Methods of removing surplus water from lands having agricultural value; protection of lands from periodical overflow of streams; reclamation of tidal lands; control and conservation of rainfall on hillside lands; construction and maintenance of farm drainage works; equipment for use in constructing and maintaining farm drainage works; and costs and methods of organizing and financing community drainage projects.

Scientific staff.—H. H. Barrows, R. A. Hart, Lewis A. Jones, R. D. Marsden, D. G. Miller, Chas. W. Okey, W. W. Weir, senior drainage engineers; O. G. Baxter, F. G. Eason, S. W. Frescoln, J. R. Haswell, A. G. Hall, H. M. Lynde, A. D. Morehouse, J. V. Phillips, C. E. Ramser, F. F. Shafer, George M. Warren, D. L. Yarnell, drainage engineers; Sidney W. Cooper, W. N. Hall, W. A. Kelly, W. G. Sloan, David E. Heizer, drainage engineers for irrigated lands; Guy A. Hart, Louie T. Jessup, and Wm. R. Overton, assistant drainage engineers; W. B. Gregory, John T. Stewart, S. M. Woodward, engineers available for special work; Willis E. Comfort, Frederick E. Staebner, civil engineer students; H. S. Yohe, expert on drainage organization; I. W. Hall, J. G. Hanford, and Will D. Nichols, draftsmen.

OFFICE OF MARKETS AND RURAL ORGANIZATION.

Chief, CHARLES J. BRAND; *Chief Clerk*, R. V. BAILEY; *Librarian*, CAROLINE B. SHERMAN.

The studies of the Office of Markets and Rural Organization cover market conditions, demands for specific crops, sources of supply, methods of grading, standardizing, packing and shipping, and the nature of the commercial transactions by means of which farm produce moves from the farm to the consumer; waste in marketing; profits in handling farm products, with means for the reduction of those which are excessive; and cooperative associations of farmers for handling rural problems. Under authority conferred by the United States cotton futures act, such data are collected as may be necessary to determine what markets are bona fide spot markets, and necessary activities are conducted in order to prescribe rules and regulations, establish and promulgate standards for cotton, and furnish forms thereof to the trade. When disputes arise between the person delivering cotton and the person receiving the same in the settlement of future contracts, questions of grade, staple, and quality are determined by the Office of Markets and Rural Organization under the authority of the Secretary.

Cotton Handling and Marketing. FRED TAYLOR, *Cotton Technologist*.

This work includes the investigation of the commercial processes involved in handling, marketing, and utilizing cotton, in order to make recommendations as to improvements and economies; the conduct of investigational work in the organizing of communities of cotton growers to market their product, and experiments regarding the advantage of growing cotton from pure seed in these communities. Studies are made to determine the value to growers of grading cotton before sale, the relative commercial value of pure-bred varieties, and the percentage of moisture in cotton, and primary market surveys are undertaken to determine the quality and variety of long-staple cottons and other matters.

Scientific staff.—D. C. Griffith and J. G. Martin, investigators in cotton marketing; C. F. Creswell, scientific assistant; O. J. McConnell and L. W. Kellner, assistants in cotton marketing; Charles H. Carpenter, agent.

Cooperative Purchasing and Marketing. CHARLES E. BASSETT and C. W. MOOMAW, *Specialists in Cooperative Organization.*

Under this project a study is made of the methods of organizing and operating co-operative marketing and purchasing associations. A survey and careful study of existing organizations of this kind are being made in order to form the basis of further investigations and to facilitate the most effective distribution of information and assistance. Specimen articles of incorporation, constitutions, and by-laws have been collected for the different kinds of marketing and purchasing organizations, and, where advisable, assistance is given to groups intending to organize.

Market Surveys, Methods, and Costs. WELLS A. SHERMAN, *Specialist in Market Surveys.*

Surveys are made to determine supplies available for market, rate of movement, outlets, and prices of specific products by definite trade areas. Questions of supply and demand for certain crops in specific markets are being studied, as is the relation of prices to market receipts and of consumption to prices. Methods are being developed for bringing useful information in regard to prices and supplies promptly to producers and consumers. A study is being made of the feasibility of establishing a telegraphic market news service. Methods of wholesale and retail distribution are being investigated.

Scientific staff.—O. W. Schleussner, A. D. Gail, jr., C. W. Dunning, Phil C. Isbell, market assistants; John W. Fisher, jr., Houston F. Walker, R. M. Peterson, J. H. Collins, Paul Froelich, James P. Klein, John C. Gilbert, and J. William Park, scientific assistants; L. H. Martin, assistant in agricultural technology.

Market Grades and Standards. CARROL T. MORE, *Investigator in Marketing Perishable Products.*

National uniformity in market grades, standards, weights, measures, packages, containers, and trade names is the object of this project. It involves preliminary investigation in the methods and requirements for marketing all kinds of farm products and experimentation to determine the most desirable grades, methods, etc., upon which to standardize.

Scientific staff.—Milton M. Stewart, assistant in market grades and standards.

City Marketing and Distribution. G. V. BRANCH, *Investigator in City Marketing.*

Investigations under this head are carried on in many of the larger cities of the country. In studying the problems involved in the provisioning of municipal populations, the possibilities of more direct and satisfactory dealing through the medium of public markets of various types are being investigated. The advantages of the various forms and systems of city distribution and the methods and costs of construction and operation of municipal markets are being studied, and upon request suggestions and information are given to city authorities and other responsible organizations.

Scientific staff.—Achsah Lippincott, assistant in city marketing investigations; John H. Sherman, collaborator.

Transportation and Storage. G. C. WHITE, *Specialist in Charge of Transportation of Farm Products.*

In this section problems involved in the transportation and storage of farm products are being investigated; methods to improve inadequate terminal and transportation facilities are being devised; shippers are being aided in securing proper car supply; the proper adjustment of minimum carload weights is being studied; remedies are being sought to overcome car shortages; and improvements in construction of specific purpose cars are sometimes suggested. The operation of iced or ventilated pick-up cars, special market trains, and suburban and interurban freight and express cars is being encouraged. Storage problems are being studied, including warehousing, ordinary cold storage, and improved refrigeration, together with their bearing upon prices and the effect of various forms of storage in stabilizing supplies and more nearly coordinating the average supply with the average demand.

Scientific staff.—T. F. Powell, specialist in transportation of farm products.

Marketing by Parcel Post and Express. LEWIS B. FLOHR, *Investigator in Marketing and Distribution.*

Experiments are being made to determine to what extent the parcel post and the services of the commercial express companies may be utilized profitably in marketing farm and nonmanufactured food products, especially in conveying them from producer to consumer direct. Various types and makes of containers are being used in making experimental shipments of nearly all classes of farm products, including extensive shipments of butter, eggs, fruits, and vegetables. Systems for bringing rural producers and urban consumers into contact and for establishing their business relationships upon a proper basis are being worked out.

Scientific staff.—C. A. Burmeister, John W. Law, and C. C. Hawbaker, scientific assistants.

Marketing Live Stock, Meats, and Meat Products. LOUIS D. HALL, *Specialist in Marketing Live Stock and Meats.*

A thorough study of existing live-stock markets and systems of marketing is in progress, including transportation facilities and agencies for the distribution of live stock and meats. This involves an investigation of methods and costs of marketing live stock and meats through centralized markets and local agencies; and a compilation of information relative to the centralized markets, their capacity, equipment, and characteristics, including a study of market classes and grades at the different points. Statistical studies of supply and demand and prices of live stock and meats at market centers and in tributary territory is contemplated.

Scientific staff.—F. M. Simpson and Stephen W. Doty, assistants in marketing live stock and meats.

Marketing Business Practice. W. H. KERR, *Investigator in Market Business Practice.*

The object of this work is to investigate the business practices of cooperative and farmers' marketing, distributing, purchasing, and rural business organizations and other marketing agencies, with special reference to their accounting systems and methods of auditing, business organization and financing, and to devise suitable accounting systems for these organizations and agencies, for the purpose of increasing their efficiency.

Scientific staff.—G. A. Nahstoll, assistant in cooperative organization accounting; J. R. Humphrey, assistant in cooperative elevator accounting; Hector Macpherson and R. M. Howard, agents, Corvallis, Oreg.; J. A. Bexell, collaborator, Corvallis, Oreg.

Grain Marketing Investigations.

Under this head investigations are made of the primary marketing of spring and winter wheat, including especially the uses and abuses of dockage in the first sale and the comparison of results in the case of grain passing from the farmer to the line elevator or to the farmers' mutual elevator; the various methods of marketing corn, both for export and import trade; future grain transactions and exchange practices; the "spread" in the marketing of various grains; grain storage, scalping, mixing and warehousing practices, track selling, and other subjects, in order to suggest possible improvements and economies in marketing the grain crop

Scientific staff.—George Livingston and Karl B. Seeds, assistants in grain marketing; L. D. H. Weld, collaborator.

Marketing Cotton Seed and its Products. H. T. POE, Jr., *Specialist in Marketing Cotton Seed and Its Products.*

In this work investigations are made of present methods of handling, marketing, and utilizing cotton seed and its products, with a view to suggesting means whereby improvements may be made and economies effected, and studies are conducted regarding the establishment of standard grades and the standardization of conditions under which cotton seed and its products are handled and stored. Special attention is given to the consideration of moisture content as a factor in grading.

Marketing Dairy Products. ROY C. POTTS, *Specialist in Marketing Dairy Products.*

In this work a thorough study of marketing dairy products and dairy substitutes will be conducted, including methods and costs of their preparation for market, market grades and classification of dairy products, market quotations and quotation systems, market requirements, market conditions, and related subjects, in order to suggest measures by which market conditions and methods may be improved and the costs of marketing dairy products reduced.

Scientific staff.—G. P. Warber and Herman F. Meyer, assistants in marketing dairy products; L. D. H. Weld, collaborator; O. B. Jesness, scientific assistant.

Cotton Warehousing Investigations. R. L. NIXON, *Assistant in Cotton Marketing.*

The object of this work is the accumulation and dissemination of useful information relating to the warehousing of cotton, insurance rates while in storage, and benefits, including better arrangements for financing, to be derived from conserving cotton in storage houses; the construction of different types of warehouses; and the relation of present methods and practices of compressing cotton to warehousing.

Scientific staff.—Roy L. Newton, assistant in warehouse investigations.

Miscellaneous Problems in Marketing and Cooperation.

Under this project study is made of new lines of work relating to the organization of rural communities, and the preparation, handling, preservation, and marketing of animal, food, and miscellaneous products not specifically provided for under other projects; the work of developing foreign markets is carried on; and cooperation with those governmental agencies already conducting investigations in the marketing of specific products is provided for.

Investigations and Demonstrations of Cotton Standards. FRED TAYLOR, *Cotton Technologist*.

Under this head are made field and laboratory investigations and demonstrations of standards for the different grades, qualities, and conditions of cotton, and investigations are carried on regarding the ginning, grading, stapling, baling, marking, compressing, and tare of cotton. Studies are made relative to standardizing Arizona-Egyptian cotton, blue-tinged, yellow-tinged, and yellow-stained cotton, the length of staple of cotton, cotton representing perished staple, immature staple, and of gin-cut cotton, reginned cotton, and cotton linters. When practicable, the services of grading experts are furnished to communities of cotton growers to demonstrate proper methods in order to secure more uniform grading in spot cotton transactions, and to show to those communities the advantages of proper grading and classification of cotton before sale. To the end that cotton quotations may be on a more uniform basis, grading and standardization demonstrations are to be conducted in certain spot markets.

Scientific staff.—Harold C. Slade, assistant in cotton marketing; T. C. Adams and H. B. Richardson, assistants in agricultural technology; Emil Schulze, agent.

Cotton Testing. Supervisory Committee: FRED TAYLOR, W. R. MEADOWS, *Cotton Technologists*; D. E. EARLE, *Specialist in Cotton Classing*.

Under this project tests are made of the waste, tensile strength, and bleaching qualities of the different grades, classes, and varieties of cotton in order to determine their commercial and spinning values. Spinning tests are being conducted on the basis of the official cotton standards of the United States, representing cotton of Upland, Texas, and Gulf growths, with staple approximately fifteen-sixteenths of an inch long, purchased from representative sections of the cotton belt, and the tentative grades of Arizona-Egyptian cotton grown in the Salt River Valley are being tested.

Scientific staff.—W. S. Dean, assistant in cotton testing; G. H. Anderson, assistant in cotton classing; C. E. Coburn, John J. W. Cooper, R. V. Hellams, C. E. Killingsworth, assistants in agricultural technology.

Rural Credit, Insurance, and Communication. C. W. THOMPSON, *Specialist in Rural Organization Work*.

This work consists of investigations relating to the organization of rural communities for the purpose of obtaining better credit, insurance, and communication facilities. This includes the study of existing successful organizations performing the functions of rural credit banks, organized activity among farmers for credit improvement; financing the breeding, feeding, and marketing of live stock; the problem of farm finance on reclamation projects in the West; the nature and extent of losses in agriculture, the facilities most helpful in reducing such losses, and other related matters.

Scientific staff.—V. N. Valgren, investigator in agricultural insurance; George Thomas, Logan, Utah, agent; A. E. Cance, Amherst, Mass., collaborator.

Rural, Social, and Educational Activities. C. W. THOMPSON, *Specialist in Rural Organization Work*.

The object of this work is the improvement of social and educational conditions in rural communities by the accumulation and dissemination of useful information growing out of a study of the social and educational needs of typical communities; the work of their existing forms of organization, and the possibilities for improvement through organized activity; the investigation of methods of encouraging social organization activities; and the study of means of improving social, economic, and educational conditions of women and children through the work of women's rural organizations.

Scientific staff.—J. Sterling Moran, Leon E. Truesdell, field assistants; Anne M. Evans, investigator in women's rural organizations; E. C. Branson, Chapel Hill, N. C.; W. E. Garnett, Charlottesville, Va.; D. J. Burleson, Auburn, Ala., collaborators.

Administration of United States Cotton Futures Act. CHARLES J. BRAND, *Chief, Office of Markets and Rural Organization*.

Supervision and direction of the investigational and regulatory activities of the Office of Markets and Rural Organization in connection with the enforcement of the United States cotton futures act and the rules and regulations of the Secretary of Agriculture thereunder, and such executive and clerical duties as may be necessary in connection therewith are carried on under this project.

Scientific staff.—Charles J. Brand, Wm. R. Meadows, Fred Taylor, H. B. Parker, D. E. Earle, D. C. Griffith, W. C. Neal, J. G. Martin, Hal Brown, O. J. McConnell, R. L. Crittenden, W. S. Dean, Harold C. Slade, R. L. Francis, board of examiners; Fred Taylor, H. B. Parker, D. E. Earle, D. C. Griffith, Hal Brown, W. S. Dean, Harold C. Slade, W. E. Chambers, and W. C. Neal, committee on final inspection; John F. Barghausen, mechanical assistant.

Determination of Disputes Under the United States Cotton Futures Act.

H. B. PARKER, *Specialist in Cotton Classing*; THOMAS B. MILLS, Jr., *Assistant in Cotton Business Methods*.

The object of this work is to hear and determine disputes as to grade, quality, or length of staple of cotton tendered in settlement of future contracts made in compliance with section 5 of the cotton futures act and referred to the Secretary of Agriculture under the terms of the act, and to draw up memoranda of conclusions upon which are based the Secretary's findings in cases of dispute.

Scientific staff.—Robert L. Crittenden and R. L. Francis, specialists in cotton classing; Hal Brown, assistant in cotton classing; E. T. Chassignac, assistant in cotton business methods; R. A. Freret, assistant in cotton marketing; O. J. Field, clerk.

Investigations of Future and Spot Markets for Cotton Under the United States Cotton Futures Act. WILLIAM R. MEADOWS, *Cotton Technologist*.

Under this head investigations are made of future markets for cotton to ascertain how accurately their future quotations reflect spot values, and to secure general information as to conditions within the future exchanges; markets are studied to determine their fitness for designation as bona fide markets; reliable quotations are secured daily from each of the designated spot markets; and the markets are inspected from time to time to see that they conform to the necessary conditions.

Scientific staff.—W. C. Neal, assistant in cotton classing; George R. Argo, assistant in cotton business methods.

Preparation and Distribution of the Official Cotton Standards of the United States Under the United States Cotton Futures Act. FRED TAYLOR, *Cotton Technologist*.

In this section is done the work of preparing and distributing the official cotton standards of the United States, promulgated by the Secretary of Agriculture on December 15, 1914, under section 9 of the United States cotton futures act; of inspecting and condemning these standards when necessary; and replacing them upon request.

Scientific staff.—D. E. Earle, specialist in cotton classing; C. E. Atkinson, assistant in cotton marketing; R. L. Kause, assistant in agricultural technology; M. L. Rice and B. M. Botto, assistants in cotton classing.

Extension and Demonstration Work.

In this section are grouped those activities conducted to carry by demonstration to the people of the United States useful information relating to the marketing and distributing of farm products and the organization of rural interests.

Scientific staff.—C. E. Bassett and C. W. Moomaw, specialists in cooperative organization; W. A. Sherman, specialist in market surveys; W. H. Kerr, investigator in market business practice; Louis D. Hall, specialist in marketing live stock and meats; C. T. More, investigator in marketing perishable products; C. W. Thompson, specialist in rural organization work; Turner Wright, ———; Fred W. Hofmann, market assistant.

BOARDS AND COMMITTEES.**Insecticide and Fungicide Board.**

The Insecticide and Fungicide Board, created December 22, 1910, assists the Secretary of Agriculture in the enforcement of the insecticide act of 1910.

Members.—J. K. Haywood, chairman; M. B. Waite, A. L. Quaintance, and James A. Emery; executive officer, J. G. Shibley.

Federal Horticultural Board.

The Federal Horticultural Board, created August 21, 1912, assists the Secretary of Agriculture in the enforcement of the plant quarantine act of August 20, 1912.

Members.—C. L. Marlatt, chairman; W. A. Orton, vice chairman; George B. Sudworth, W. D. Hunter, and Karl F. Kellerman; R. C. Althouse, secretary of board.

Committee on the Editing of the Journal of Agricultural Research.

The Journal of Agricultural Research publishes technical papers giving the results of the various lines of research carried on by the department or by the State agricultural experiment stations. The selection of the papers and the conduct of the Journal are intrusted to this committee.

Members.—K. F. Kellerman, chairman; E. W. Allen, and C. L. Marlatt, for the Department of Agriculture; Raymond Pearl (Maine), H. P. Armsby (Pennsylvania), and E. M. Freeman (Minnesota) for the Association of American Agricultural Colleges and Experiment Stations.

AGRICULTURAL COLLEGES AND EXPERIMENT
STATIONS.

KEY TO ABBREVIATIONS.

- Acct.*, Accountant, Accounts.
Actg., Acting.
(Actg.), Acting Professor.
(Adjunct), Adjunct Professor.
Agr., Agriculture, Agriculturist, Agricultural.
Agron., Agronomy, Agronomist.
Agt., Agent.
An., Animal.
Anal., Analytical, Analysis.
Anat., Anatomy.
Archit., Architecture.
Assoc., Associate.
(Assoc.), Associate Professor.
Asst., Assistant.
(Asst.), Assistant Professor.
Bact., Bacteriology, Bacteriologist.
Biol., Biology, Biologist, Biological.
Bot., Botany, Botanist, Botanical.
Br., Branch.
Brdg., Breeding.
Chair., Chairman.
Chem., Chemistry, Chemist, Chemical.
Climat., Climatology, Climatologist.
Coll., College.
Comp., Comparative.
Comr., Commissioner.
Consult., Consulting.
Coop., Cooperation, Cooperative, Cooperator.
Corresp., Correspondence, Correspondent.
Dem., Demonstration, Demonstrator.
Dept., Department.
Dir., Director.
Dist., District.
Distrib., Distribution.
Div., Division.
Dom., Domestic.
Econ., Economy, Economic, Economics.
Ed., Education.
Ele., Elementary.
Engin., Engineer, Engineering.
Ent., Entomology, Entomologist, Entomological.
Erad., Eradication.
Expt., Experiment, Experimentalist, Experimental.
Ext., Extension.
(Ext.), Extension Professor.
(Ext. Asst.), Extension Assistant Professor.
(Ext. Assoc.), Extension Associate Professor.
Feed., Feeding.
Fert., Fertility, Fertilizer.
Flor., Floriculture, Floriculturist, Floricultural.
For., Forestry.
Gard., Gardening.
Gen., General.
Geol., Geology, Geologist, Geological.
Grad., Graduate.
Hist., History.
Hort., Horticulture, Horticulturist, Horticultural.
Husb., Husbandry, Husbandman.
Hyg., Hygiene.
Indus., Industry, Industrial, Industries.
Inorg., Inorganic.
Insp., Inspection, Inspector.
Insts., Institutes
Instr., Instruction, Instructor.
Invest., Investigations, Investigational.
Irrig., Irrigation, Irrigationist.
Lab., Laboratory.
Landsc., Landscape.
Lect., Lecturer.
Libr., Library, Librarian.
Mach., Machine, Machinery.
Mech., Mechanics, Mechanical.
Mct., Meteorology, Meteorologist.
Mfrs., Manufactures.
Mgr., Manager.
Mgt., Management.
Mycol., Mycology, Mycologist.
Nat., Natural.
Nutr., Nutrition.
Oler., Olericulture, Olericulturist.
Org., Organic.
Ornith., Ornithology, Ornithologist.
Parasitol., Parasitology, Parasitologist.
Path., Pathology, Pathologist.
Pedag., Pedagogy, Pedagogics.
Pharm., Pharmacy, Pharmacist, Pharmaceutical.
Photog., Photography, Photographer.
Phys., Physics, Physicist, Physical.
Physiol., Physiology, Physiologist, Physiological.
Pomol., Pomology, Pomologist, Pomological.
Pract., Practice, Practical.
Prep., Preparatory.
Pres., President.
Prin., Principal.
Prod., Production, Products.
Sch., School.
Sci., Science, Scientific.
Sec., Secretary.
Secon., Secondary.
Sociol., Sociology.
Sta., Station.
Substa., Substation.
Supt., Superintendent.
Surg., Surgery.
Tech., Technology, Technologist, Technical.
Treas., Treasurer.
Trop., Tropical.
Univ., University.
Veg., Vegetable, Vegetation.
Vet., Veterinary, Veterinarian.
Vit., Viticulture, Viticulturist, Viticultural.
Voc., Vocational.
Zool., Zoology, Zoologist.

AGRICULTURAL COLLEGES AND EXPERIMENT STATIONS.¹

(Prepared in the States Relations Service,

A. C. TRUE, *Director.*)

ALABAMA.

Alabama Polytechnic Institute and the Agricultural Experiment Station, Auburn.

*College faculty. †Station staff. ‡Extension staff.

*C. C. Thach, A. M., LL. D., *President.*

*†‡J. F. Duggar, M. S., *Dir. Sta. Dir. Ext. Work. Agr. (*†)*

*†Samuel Adler, M. S., *Asst. Chem.*

†J. T. Anderson, Ph. D., *Chem., Soil and Crop Invest.*

*P. F. Bahnsen, V. S., *Lect. Phys. Diagnosis.*

*Thomas Bragg, M. S., (*Asst.*) *Chem.*

*†J. E. Buck,² M. S., *Instr. Ent.; Asst. Ent.*

†D. J. Burleson, *Ext. Asst. in Agron.*

*†J. S. Caldwell, Ph. D., *Bot.; Plant Physiol.*

*†C. A. Cary, B. S., D. V. M., *Dean Vet. Med. and Surg., Physiol.; Vet. (State Vet.) Dir. Farmers' Insts.*

†E. F. Cauthen, B. S., *Assoc. Agr., Recorder.*

†L. N. Duncan, M. S., *Junior and Home Econ. Ext. Work (Coop. U. S. D. A.).*

*C. W. Ferguson, D. V. M., M. D. C., *Instr. Vet. Med.*

†J. C. Ford, M. S., *Pig Clubs (Coop. U. S. D. A.).*

*†M. J. Funchess, M. S., (*Assoc.*) *Agr.; Assoc. Agr.*

†Ernest Gibbens, B. S. (*Allenville*), *Asst. in Beef Husb.*

*†E. S. Girton, B. S., (*Assoc.*) *An. Indus.; Asst. An. Indus.*

*†C. L. Hare, M. S., *Phys., Physiol. Chem.; Chem.*

*†W. E. Hinds, Ph. D., *Ent.*

†I. B. Kerlin, *Asst. in Corn Club Work (Coop. U. S. D. A.).*

*†I. S. McAdory, B. S., D. V. M., (*Asst.*) *Vet. Sci.; Asst. Vet.*

*†A. B. Massey, B. S., (*Asst.*) *Bot.; Asst. Bot.*

*P. P. Powell, M. S., (*Asst.*) *Chem.*

*†J. C. C. Price, B. S., *Instr. Hort.; Asst. Hort.*

*†L. F. Pritchett, D. V. M., *Asst. in Vet. Sci.*

†Madge J. Reese, *Asst. Girls' Dem. Work (Coop. U. S. D. A.).*

*B. B. Ross, M. S., *Dean Agr. Sci., Chem. (State Chem.).*

*J. R. Rutland, A. B., *Libr.*

†O. H. Sellers, B. S., *Asst. Agr., Sec. to Dir.*

†G. V. Stelzenmuller, B. S., *Hort. Field Agr.*

¹ These lists were compiled by Mary A. Agnew and Althea E. Thacker, of the States Relations Service, and are intended to replace the "Organization Lists of the Agricultural Colleges and Experiment Stations in the United States" heretofore issued by that office. They differ from the latter in that they include only names of persons directly engaged in teaching, investigation, or demonstration in agriculture and home economics.

The names are arranged alphabetically for each institution. This arrangement, with the name index at the end of the bulletin, it is thought, will facilitate the finding of names, especially in the longer lists. An asterisk (*) indicates a college officer, a dagger (†) a station officer, and a double dagger (‡) an extension worker. When the title of the position in the station differs from that in the college the latter is given first, except in the case of the director of the station. A key to the abbreviations used is given on page 38.

² On leave.

ALABAMA—Continued.

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| ‡Nellie M. Tappen (<i>Montevallo</i>), <i>Asst. in Girls' Dem. Work.</i> | *W. W. Webb, D. V. M., <i>Instr. Physiol., Therapeutics.</i> |
| *‡G. S. Templeton, B. S., <i>An. Husb.</i> | *G. R. White, M. D., D. V. S., <i>Lect. on An. Restraint, Surg.</i> |
| *‡F. L. Thomas, Ph. D., (<i>Asst.</i>) <i>Ent.; Asst. Ent.</i> | ‡J. T. Williamson, B. S., <i>Agr. Field Agt.</i> |
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| ‡E. A. Vaughan, M. S., <i>Field Agt. in Ent.</i> | *‡F. A. Wolf, Ph. D., <i>Plant Path.</i> |
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Canebrake Agricultural Experiment Station, Uniontown.

‡L. H. Moore, *Director in charge.*

Agricultural and Mechanical College for Negroes, Normal.

*College faculty.

*W. S. Buchanan, B. A. S., A. M., *President. Agr.*

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|---|--|
| *Rosa Black, <i>Cooking.</i> | *W. T. Gravitt, <i>Farm Mgt.</i> |
| *Samantha Brawley, <i>Plain Sewing.</i> | *H. C. Hopkins, M. S., <i>Agr.</i> |
| *Mrs. Jennie L. Cockrell, <i>Laundrying.</i> | *Mrs. J. W. Miller, <i>Housekeeping.</i> |
| *Mrs. Ellen M. Darnell, <i>Millinery, Fancy Sewing.</i> | *P. C. Parks, B. S., <i>Agr.</i> |
| *Miss Willie Desmuke, <i>Dressmaking.</i> | *A. G. Robertson, M. D., <i>Chem.</i> |
| | *Mrs. Pearl L. Younge, <i>Nursing.</i> |

Agricultural School and Agricultural Experiment Station of the Tuskegee Normal and Industrial Institute, Tuskegee Institute.

*College faculty. ‡Station staff. ‡Extension staff.

*B. T. Washington, *Principal.**‡G. W. Carver, M. S., *Dir. Sta. Dept. of Research, Consult. Chem. (*‡)*‡C. J. Calloway, *Dir. Ext. Div.*

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|---|---|
| *H. B. Benson, <i>Canning, Swine Raising.</i> | *‡R. S. Pompey, <i>Dairy Husb.</i> |
| *‡J. H. Bias, D. V. S., <i>Vet.</i> | *‡O. D. Pyles, <i>Asst. Agr. Instr.; Agr. Chem.</i> |
| *‡H. H. Boger, <i>Live Stock, Fert.</i> | *Rebecca M. Quinton, <i>Plain Sewing.</i> |
| *‡G. R. Bridgeforth, B. S., <i>Dir. Agr. Indus.</i> | *‡N. D. Rick, <i>Fruit Growing.</i> |
| *‡M. W. Brooks, <i>Truck Gard.</i> | *Susan M. Russell, <i>Dom. Sci.</i> |
| ‡T. M. Campbell, <i>Dem. and Farmers' Inst. Work.</i> | *Ernestine Suarez, <i>Libr.</i> |
| *‡T. N. Cowen, <i>Farm Supt.</i> | ‡W. A. Tate, <i>U. S. Dem. Work.</i> |
| *Mary E. Davis, <i>Housekeeping.</i> | *L. C. Taylor, <i>Plain Sewing.</i> |
| *Minnie E. Davis, <i>Housekeeping.</i> | *Cornelia A. Vivian, <i>Millinery.</i> |
| *‡E. C. Dobbs, <i>Farming.</i> | *Mrs. B. T. Washington, <i>Dir. Women's Indus.</i> |
| *Ophelia M. Donaldson, <i>Asst. Laundrying.</i> | ‡B. T. Washington, jr., <i>Asst. Dir. Ext. Div.</i> |
| *‡J. R. Fugett, <i>Dairying.</i> | *‡L. J. Watkins, <i>Road Bldg., Survey.</i> |
| *Mollie E. Golden, <i>Housekeeping.</i> | *Luvenia Williams, <i>Housekeeping.</i> |
| *C. A. Graine, <i>Laundrying.</i> | *‡Matthew Woods, <i>Horse Husb.</i> |
| *‡C. W. Greene, <i>Poultry.</i> | |
| *Hattie E. King, <i>Dressmaking.</i> | |
| *‡E. M. Parrish, <i>Soils, Farm Crops.</i> | |

ALASKA.

Agricultural Experiment Stations, Sitka, Kodiak, Rampart, and Fairbanks.

Under the supervision of the Office of Experiment Stations, States Relations Service, U. S. Department of Agriculture.

‡Station staff.

‡C. C. Georgeson, M. S., *Agronomist in charge, Sitka.*

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| ‡J. P. Anderson, <i>Hort., Sitka.</i> | ‡J. W. Neal, <i>Asst. in charge, Fairbanks.</i> |
| ‡T. D. Crippen, B. S., <i>Plant Breeder, Rampart.</i> | ‡H. E. Pratt, B. S., <i>Asst. Dairyman, Kodiak.</i> |
| ‡G. W. Gasser, B. S., <i>Asst. in charge, Rampart.</i> | ‡M. D. Snodgrass, B. S., <i>Asst. in charge, Kodiak.</i> |
| ‡C. W. Heideman, jr., <i>Herdsman, Kodiak.</i> | |

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CALIFORNIA—Continued.

- *Katherine D. Jones, B. S., *Asst. Landsc. Gard.*
- *†W. P. Kelley, Ph. D. (*Riverside*), *Agr. Chem.*
- *†P. B. Kennedy, Ph. D., (*Asst.*) *Agron.; Asst. Agron.*
- *†O. J. Kern, (*Asst.*) *Agr. Ed.; Agr. Ed.*
- *James Koeber, M. S. (*Davis*), *Instr. Farm Mech.*
- *†M. B. Kurtz, D. V. M., *Asst. in Hog Cholera Serum Lab.*
- *†E. J. Lea, M. S., (*Assoc.*) *Nutr.; Assoc. Nutr.*
- *†C. B. Lipman, Ph. D., *Soil Chem., Bact.*
- *†W. E. Lloyd, B. S. (*Davis*), *Asst. Poultry Husb.*
- *†R. H. Loughridge, Ph. D., *Agr. Chem., Soil Chem. (Emeritus).*
- †Anna M. Lute, A. B., *Seed Tester (U. S. D. A. Service).*
- †F. F. Lyons, B. S. (*Stockton*), *Asst., Agr. Ext.*
- †R. R. Mack, B. S. (*Bakersfield*), *Asst., Agr. Ext.*
- *†B. A. Madson, B. S. A. (*Davis*), (*Asst.*) *Agron.; Asst. Agron.*
- †L. K. Marshall (*Fresno*), *Asst. Agron.*
- *†W. C. Matthews, A. B., *Instr. Sci. Illustration; Artist.*
- *†Margaret Mayberry (*Davis*), *Libr. Univ. Farm.*
- †T. C. Mayhew, B. S. (*Madera*), *Asst., Agr. Ext.*
- †W. M. Mertz (*Riverside*), *Supt. Cultivation.*
- *†Woodbridge Metcalf, M. S., (*Asst.*) *For.; Asst. For.*
- †M. R. Miller, B. S., *Asst. Chem., Insecticide Control.*
- *†R. F. Miller, M. S. (*Davis*), *An. Husb.*
- †C. S. Milliken, B. S. (*Riverside*), *Asst. Supt. Agr. Ext.*
- *†J. F. Mitchell, D. V. M., (*Asst.*) *Vet. Sci.; Asst. Vet.*
- †J. N. Moore (*Chico*), *Foreman For. Sta.*
- *Mrs. Agnes M. Morgan, Ph. D., (*Asst.*) *Nutr.*
- *†D. N. Morgan, B. S., *Sec. Coll.; Asst. to Dir.*
- †E. L. Morris, A. B. (*San José*), *Field Asst. in Ent.*
- *†Walter Mulford, F. E., *For.*
- *†J. W. Nelson, B. S., (*Asst.*) *Soil Tech.; Asst. Soil Tech.*
- *†L. J. Nickels, B. S. (*Davis*), *Instr. Insect Indus.; Asst. Ent.*
- †W. H. Nixon, B. S. (*Hayward*), *Asst., Agr. Ext.*
- †W. F. Oglesby, A. B., *Asst. Vit.*
- †W. E. Packard, M. S. (*El Centro*), *Expt. Agron. In charge Imperial Valley Substa.*
- †W. B. Parker, B. S. (*Ventura*), *Asst., Agr. Ext.*
- †R. L. Pendleton, B. S., *Asst. Soil Tech.*
- *†M. B. Pratt, M. F., (*Asst.*) *For.; Asst. For.*
- *†H. J. Quayle, M. S. (*Riverside*), (*Assoc.*) *Ent.; Assoc. Ent.*
- *†H. S. Reed, Ph. D. (*Riverside*), *Plant Physiol.*
- *†C. L. Roadhouse, D. V. M., (*Assoc.*) *Vet. Sci.; Assoc. Vet.*
- *†S. S. Rogers, B. S. (*Davis*), (*Asst.*) *Plant Path.; Asst. Plant Path.*
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- *†W. A. Setchell, Ph. D., *Bot.*
- †L. T. Sharp, B. S., *Asst. Soil Chem., Bact.*
- *†C. F. Shaw, B. S., *Soil Tech.*
- *†Alfred Smith, M. A., *Instr. Soil Tech.; Asst. Soil Tech.*
- †C. O. Smith, M. S. (*Whittier*), *Asst. Plant Path.*
- †Elizabeth H. Smith, M. S., *Asst. Plant Path.*
- *†R. E. Smith, B. S., *Plant Path.*
- *†R. T. Stevens, B. S., (*Asst.*) *Landsc. Gard.; Asst. Landsc. Gard.*
- *†G. R. Stewart, B. S., (*Asst.*) *Agr. Chem.; Asst. Agr. Chem.*
- *†Mattie E. Stover, B. S., *Instr. Nutr.; Asst. Nutr.*
- *†A. V. Stubenrauch, M. S., *Pomol.*
- *Thomas Tavernetti, B. S. (*Davis*), *Asst. to Dean Univ. Farm Sch.*
- *†R. H. Taylor, B. S. (*Davis*), *Instr. Pomol.; Asst. Pomol.*
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- †E. E. Thomas, B. S. (*Whittier*), *Asst. Chem.*
- *†J. I. Thompson, B. S. (*Davis*), (*Asst.*) *An. Husb.; Asst. An. Husb.*
- *†Jacob Traum, D. V. M., (*Asst.*) *Vet. Sci.; Asst. Vet.*
- *†G. H. True, M. S. (*Davis*), *An. Husb.*
- †A. R. Tylor, B. S. (*Whittier*), *Asst. in Plant Path.*
- *†R. S. Vaile, B. A. (*Riverside*), *Orchard Mgt.*
- *†E. P. Van Duzee, *Instr. Ent.; Asst. Ent.*
- *†E. C. Van Dyke, B. S., M. D., *Instr. Ent.; Asst. Ent.*
- *†H. E. Van Norman, B. S. (*Davis*), *Dean Univ. Farm Sch., Dairy Mgt.; Vice Dir. Sta.*
- †W. H. Volck (*Watsonville*), *Field Asst. in Ent.*
- †E. C. Voorhies, B. S. (*Davis*), *Asst. An. Husb.*
- †A. E. Way (*Fresno*), *Asst. Vit.*
- *†H. J. Webber, Ph. D., D. Agr. (*Riverside*), *Dean Grad. Sch. Trop. Agr. Plant Brdg.; Dir. Citrus Sta.*
- †W. W. Weir, *Drainage Invest. (Coop. U. S. D. A.).*
- *†E. J. Wickson, M. A., *Hort.*
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- *†F. W. Woll, Ph. D. (*Davis*), *An. Nutr.*
- *†C. W. Woodworth, M. S., *Ent.*
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COLORADO.

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| *L. E. Rast, B. S. A., (Adjunct) <i>Agron., in charge Cotton Indus.</i> | *C. A. Whittle, A. B., <i>Editor, Libr.</i> |
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| *Mrs. W. G. Hill, <i>Instr. Dom. Sci.</i> | *Mrs. W. P. White, <i>Instr. Sewing, Dress-making.</i> |
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Under the supervision of the Office of Experiment Stations, States Relations Service, U. S. Department of Agriculture.

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†L. B. Barber, D. V. M., *Vet., An. Husb.* | †Peter Nelson, *Asst.*

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†A. T. Speare, A. M., *Asst. Path.*

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†W. H. Heideman, *Forcman Clagstone Substa.*

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*†O. W. Holmes, B. S., (Asst.) *Dairying; Asst. Dairyman.*

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*Hallie Hyde, B. S., *Instr. Home Econ.*

‡C. E. Johnson, B. S. (Twin Falls), *Ext. Work (Coop. U. S. D. A.).*

‡Amy Kelly, B. S. (Boise), *Ext. Work.*

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*†Prentice Moore, *Instr. Poultry Husb.; Poultryman.*

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†J. S. Scott, *Farm Supt.*

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¹ On leave.

IDAHO—Continued.

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*†C. C. Vincent, M. S. A., <i>Hort.</i>
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†H. W. Rickey, *Ext. Work in Poultry (Coop. U. S. D. A.).*
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 *D. L. Lawson, *Nat. Sci.*

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MASSACHUSETTS—Continued.

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² On leave.

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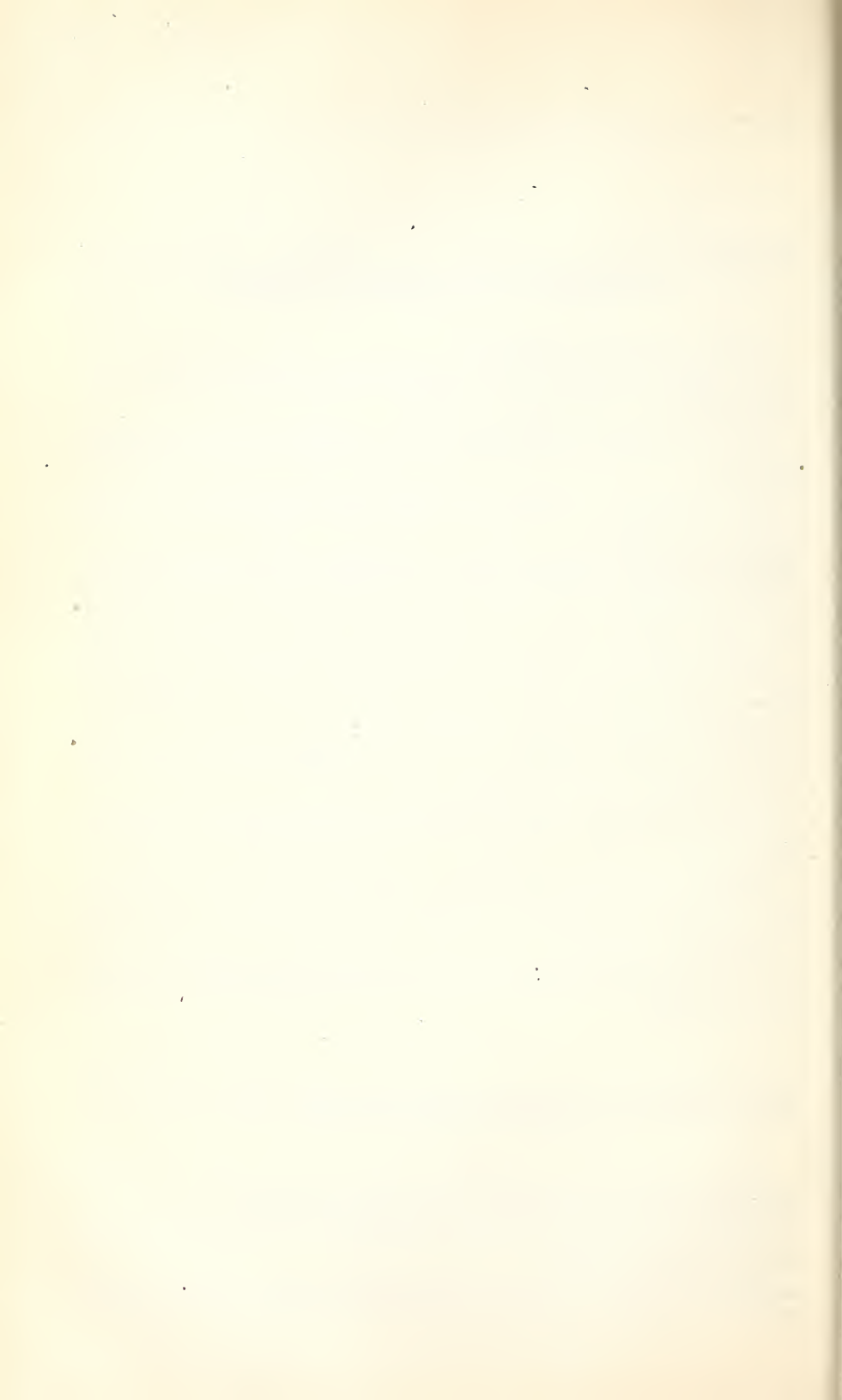
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INDEX OF NAMES.

- Aase, H., 88.
 Abbe, C., 6.
 Abbey, M. J., 89.
 Abbott, C. H., 88.
 Abbott, J. B., 69.
 Abbott, J. S., 18.
 Abbott, W. S., 24.
 Abell, M. F., 76.
 Ackerman, A. J., 24.
 Ackert, J. E., 55.
 Acree, S. F., 12.
 Adams, B., 71.
 Adams, C. H., 13.
 Adams, C. L., 90.
 Adams, E. L., 15.
 Adams, F., 32, 42.
 Adams, G. E., 81.
 Adams, J. B., 10.
 Adams, J. F., 80.
 Adams, J. W., 44.
 Adams, M. (Iowa), 52.
 Adams, M. (Nev.), 69.
 Adams, R. G., 88.
 Adams, R. L., 42.
 Adams, T. C., 16, 35.
 Adler, S., 39.
 Agee, A., 70, 93.
 Agee, H. P., 48.
 Agee, J. H., 23.
 Ahearn, M. F., 55.
 Ahrens, B. A., 78.
 Aicher, L. C., 15, 48.
 Aiken, W. L., 87.
 Ainslie, C. N., 23.
 Ainslie, G. G., 23.
 Ainsworth, T. L., 31.
 Aitkenhead, W., 51.
 Albin, H. C., 21.
 Albright, A. R., 19.
 Alciatore, H. F., 7.
 Alcock, J. R., 60.
 Alder, B., 85.
 Alderman, E. S., 31.
 Alderman, W. H., 89.
 Aldrich, J. M., 23, 51.
 Alexander, A. S., 90.
 Alexander, C. P., 71.
 Alexander, H. C., 59.
 Aley, R. J., 59.
 Alford, S. W., 68.
 Allard, H. A., 15.
 Allee, W. G., 55.
 Allen, B. F., 67.
 Allen, E. M., 76.
 Allen, E. R., 77.
 Allen, E. W., 28, 36, 93.
 Allen, F. W., 88.
 Allen, H., 60.
 Allen, H. E., 51.
 Allen, H. W., 25.
 Allen, L. J., 8.
 Allen, P. W., 49.
 Allen, R., 55.
 Allen, R. M., 22, 57.
 Allen, R. S., 60.
 Allen, R. T., 23.
 Allen, R. W., 78.
 Allen, T. W., 31.
 Allison, E., 51.
 Allison, H. O., 66.
 Allison, I. D., 49.
 Allison, I. M. K., 44.
 Allison, J. H., 63.
 Allison, J. H., jr., 52.
 Allyn, O. M., 49.
 Almy, L. H., 21.
 Alps, H. F., 7.
 Alsberg, C. L., 18.
 Althouse, R. C., 36.
 Alway, F. J., 63.
 Ames, C. T., 65.
 Ames, F. E., 13.
 Ames, J. W., 77.
 Anderson, A. C., 61.
 Anderson, A. E., 68.
 Anderson, A. P., 31.
 Anderson, B. G., 86.
 Anderson, C. L., 85.
 Anderson, C. R., 80.
 Anderson, E., 60.
 Anderson, F. E., 41.
 Anderson, F. T., 19.
 Anderson, G. F., 86.
 Anderson, G. G., 10.
 Anderson, G. H., 35.
 Anderson, G. M., 82.
 Anderson, J. P., 28, 40.
 Anderson, J. T., 39.
 Anderson, O. G., 51.
 Anderson, O. H., 51.
 Anderson, P. J., 60.
 Anderson, R. J., 73.
 Anderson, W. S., 57.
 Anderton, B. A., 31.
 Andree, R. A., 90.
 Andrew, J. P., 30.
 Andrews, E. L., 89.
 Andrews, F., 27.
 Andrews, J. B., 49.
 Angell, M. F., 48.
 Ansporn, B. W., 60.
 Anthony, E. L., 80.
 Anthony, R. D., 73.
 Anthony, S., 15.
 App, F., 70.
 Appleman, C. O., 60.
 Arbenz, H. L., 31.
 Arey, J. A., 8.
 Argo, G. R., 36.
 Armington, J. H., 7.
 Armsby, H. P., 36, 80, 81, 93.
 Armstrong, B. K., 46.
 Armstrong, J. A., 42.
 Armstrong, V. B., 90.
 Arnett, C. N., 67.
 Arnett, L. D., 89.
 Arnold, J. A., 26.
 Arnold, J. H., 4.
 Arnold, W. H., 42.
 Army, A. C., 63.
 Arthur, C. M., 70.
 Arthur, J. C., 51.
 Arthur, M., 41.
 Arzberger, E. G., 16.
 Ashby, R. C., 63.
 Ashby, W., 32.
 Ashe, W. W., 12.
 Ashley, A. M., 4.
 Ashley, R. H., 59.
 Atherton, M., 85.
 Atkeson, T. C., 89.
 Atkinson, A., 67.
 Atkinson, C. E., 36.
 Atkinson, T. W., 53.
 Atwater, A. M., 71.
 Atwater, H. W., 30.
 Atwood, H., 89.
 Aubry, V. G., 70.
 Auchter, E. C., 89.
 Aull, W. B., 82.
 Aumer, J. P., 49.
 Aune, B., 17.
 Aust, F. A., 49.
 Averill, A. W., 59.
 Averitt, S. D., 57.
 Avery, S., 68, 93.
 Ayers, G. D., 48.
 Ayers, S. H., 8.
 Ayres, B., 83, 93.
 Baade, W. J., 42.
 Babb, J. G., 66.
 Babcock, D. C., 77.
 Babcock, E. B., 42.
 Babcock, F. R., 15.
 Babcock, H. E., 71.
 Babcock, S. M., 90.
 Bachman, F., 90.
 Bachtell, M. A., 76.
 Back, E. A., 24.
 Backstrom, J. F., 65.
 Backus, L. S., 66.

- Bacon, C. W., 15.
 Baer, A. A., 68.
 Baer, A. C., 90.
 Bahnsen, P. F., 39.
 Bailey, C. H., 63.
 Bailey, D. E., 52.
 Bailey, E. A., 46.
 Bailey, E. M., 45.
 Bailey, E. W., 49.
 Bailey, F. D., 78.
 Bailey, H. S., 18, 19.
 Bailey, I. M., 30.
 Bailey, L. E., 42.
 Bailey, L. H., 21.
 Bailey, L. P., 76.
 Bailey, N. A., 75.
 Bailey, R. V., 32.
 Bain, J. B., 8.
 Bain, S. M., 83.
 Bair, W. H., 55.
 Baird, H. S., 42.
 Baker, A. C., 24.
 Baker, C. A., 44.
 Baker, E. D., 55.
 Baker, F. R., 74.
 Baker, G., 59.
 Baker, G. J., 63.
 Baker, H. J., 44.
 Baker, M. B., 63.
 Baker, M. S., 41.
 Baker, O. E., 4.
 Baker, P. S., 80.
 Baker, T. A., 71.
 Baker, W. C., 71.
 Bakke, A. L., 52.
 Balcom, R. W., 19.
 Baldinger, H. E., 60.
 Baldwin, L., 63.
 Baldwin, M., 23.
 Baldwin, R. J., 61.
 Balis, W. H., 58.
 Ball, C. R., 15.
 Ball, E. D., 85.
 Ball, J. S., 4.
 Ball, J. W., 31.
 Ball, O. M., 84.
 Ballantyne, A. B., 85.
 Ballard, C. M., 10.
 Ballard, W. R., 60.
 Ballard, W. S., 14.
 Ballinger, F., 67.
 Ballou, F. H., 77.
 Balls, A. K., 20.
 Balmer, F. E., 63.
 Banes, L., 88.
 Banks, N., 25.
 Barber, C. W., 59.
 Barber, E. H., 31.
 Barber, E. R., 23.
 Barber, G. W., 23.
 Barber, H. S., 25.
 Barber, H. W., 29.
 Barber, L. B., 29, 47.
 Bardenwerper, K., 69.
 Barghausen, J. F., 16, 35.
 Barker, E. E., 71.
 Barker, H. C., 52.
 Barker, H. H., 66.
 Barker, H. S., 57.
 Barker, J. F., 73.
 Barker, P. B., 68.
 Barlow, F., 44.
 Barlow, J., 81.
 Barnes, B. W., 75.
 Barnes, G. W., 41.
 Barnes, M. F., 75.
 Barnes, R. A., 67.
 Barnes, W. C., 11.
 Barnett, C. R., 27.
 Barnett, E., 65.
 Barnett, N. M., 89.
 Barnett, R. J., 88.
 Barnette, W. A., 82.
 Barney, W. B., 22.
 Barnhard, H. E., 22.
 Barnhart, J. M., 49.
 Barovetto, G., 42.
 Barr, W. A., 8, 78.
 Barre, H. W., 82.
 Barrett, E. L., 23.
 Barrett, J. T., 42.
 Barrett, L. A., 13.
 Barrilleaux, C. J., 58.
 Barron, J. H., 71.
 Barron, W. E., 7.
 Barrows, H. H., 32.
 Barrows, H. R., 59.
 Barrows, W. B. (Mich.), 61.
 Barrows, W. B. (U. S. D. A.), 12.
 Barrows, W. M., 76.
 Barrus, M. F., 71.
 Barss, A. F., 78.
 Barss, H. P., 78.
 Bartholomew, C. E., 52.
 Bartholomew, R., 55.
 Bartlett, H. H., 15.
 Bartlett, J. M., 59.
 Bartlett, J. W., 70.
 Barto, D. O., 49.
 Barton, W. H., 82.
 Bassett, C. E., 33, 36.
 Bassett, L. B., 63.
 Baston, G. H., 15.
 Batchelder, C. H., 69.
 Batchelor, L. D., 42.
 Bates, C., 20.
 Bates, E. F., 84.
 Bates, W. E., 42.
 Bathgate, R. C., 80.
 Batten, E. T., 86.
 Battiste, M. J., 82.
 Bauer, F. C., 49.
 Baughman, W. F., 21.
 Bausman, R. O., 51.
 Baxter, O. G., 32.
 Beach, B. A., 90.
 Beach, C. L., 44.
 Beach, D., 59.
 Beach, S. A., 52.
 Beagles, R. L., 18.
 Beal, A. C., 71.
 Beal, J. M., 65.
 Beal, W. H., 27, 28, 93.
 Beal, W. J., 61.
 Beals, C. L., 60.
 Beals, E. A., 6, 7.
 Bean, R. P., 18.
 Bear, F. E., 89.
 Beard, R. F., 78.
 Beath, O. A., 92.
 Beattie, J. H., 14.
 Beattie, R., 66.
 Beaumont, A. B., 71.
 Beavers, J. C., 51.
 Bechdel, S. I., 80.
 Bechtel, J. R., 80.
 Beck, E., 32.
 Beck, M. W., 23.
 Beckenstrater, H., 60.
 Becker, G. G., 41.
 Becker, J. A., 90.
 Beckett, S. H., 32, 42.
 Beckman, F. W., 52.
 Beckwith, A. M., 14.
 Beckwith, T. D., 78.
 Beebe, L. L., 32.
 Beegle, F. M., 77.
 Beeler, M. N., 46.
 Beeson, M. A., 78.
 Behnhart, E. G., 15.
 Bell, A. T., 58.
 Bell, F. W., 84.
 Bell, G. A., 7.
 Bell, J. D., 44.
 Bell, R. M., 42.
 Bell, W. B., 75.
 Belling, J., 46.
 Bellis, A. E., 92.
 Bellomy, A. W., 55.
 Belz, J. O., 16.
 Bemis, B. E., 63.
 Bemis, H. E., 52.
 Bender, W. H., 63.
 Bengis, R., 21.
 Bengtson, N. A., 68.
 Benjamin, E. W., 71.
 Benkendorf, G. H., 90.
 Benner, J. W., 55.
 Bennett, C. D., 15.
 Bennett, C. M., 4.
 Bennett, H. H., 23.
 Bennett, J. P., 66.
 Benson, H. B., 40.
 Benson, O. H., 30.
 Bentley, F. L., 66.
 Bentley, G. A., 11.
 Bentley, G. M., 83.
 Bentley, J., jr., 71.
 Bentley, M., 52.
 Bentley, W. D., 78.
 Bentley, W. H., 90.
 Benton, A. H., 63.
 Benton, G. P., 86.
 Berg, A., 89.
 Berg, C. A., 63.
 Berg, W. U., 9.
 Berger, E. W., 46.
 Bergh, O. I., 63.
 Bergman, H. D., 52.
 Berry, J. B., 46.
 Berry, J. T., 63.

- Besemer, A. M., 71.
 Besley, F. W., 60.
 Besley, H. J., 15.
 Besse, R. H., 92.
 Bessey, E. A., 61.
 Bethell, B. O., 84.
 Betten, C., 71.
 Betts, H. S., 12.
 Betts, M. C., 32.
 Betz, M., 76.
 Bevier, I., 49.
 Bewick, T. L., 90.
 Bexell, J. A., 34.
 Beyer, A. H., 23.
 Bias, J. H., 40.
 Bibby, I. J., 80.
 Bidwell, G. L., 20.
 Bigford, G. L., 46.
 Biggar, H. H., 15.
 Billings, G. A., 4.
 Billings, H. E., 42.
 Billings, R. M., 58.
 Bilsing, S. W., 84.
 Binding, L. R., 49.
 Binford, E. E., 84.
 Bingham, S. L., 85.
 Binnewies, E., 83.
 Binzel, C. E., 90.
 Bioletti, F. T., 42.
 Birchner, V., 20.
 Bird, H. S., 17.
 Birdsall, B. W., 55.
 Birdseye, M., 71.
 Bisbee, D. B., 21.
 Bishop, E. C., 52.
 Bishopp, F. C., 25.
 Bisset, P., 18.
 Bitler, R. O., 51.
 Bittenbender, H. A., 52.
 Bixby, F. L., 32, 71.
 Bizzell, J. A., 71.
 Bizzell, W. B., 84.
 Black, C. A., 69.
 Black, H. V., 46.
 Black, O. F., 15.
 Black, R., 40.
 Black, R. S., 66.
 Blackburn, R. E., 46.
 Blackshear, E. L., 85.
 Blackwell, J. D., 84.
 Blair, A. W., 70.
 Blair, E. C., 74.
 Blair, J. C., 49.
 Blair, M. J., 63.
 Blair, R. E., 17.
 Blair, W. R., 6.
 Blake, M. A., 70.
 Blakeslee, A. F., 44.
 Blakeslee, E. B., 24.
 Blanchard, F. N., 60.
 Blanchard, H. L., 88.
 Blanchard, R. A., 67.
 Blaney, H. W., 49.
 Blaney, L., 69.
 Bledsoe, R. P., 55.
 Bleile, A. M., 76.
 Blinn, P. K., 44.
 Bliss, G. S., 7.
 Bliss, R. K., 52.
 Blizzard, W. L., 78.
 Blodgett, F. H., 84.
 Blodgett, F. M., 73.
 Blohm, A. F., 76.
 Bloodgood, D. W., 71.
 Bluford, J. H., 75.
 Blumenthal, P. L., 57.
 Blundon, B. A., 6.
 Blystone, M. E., 7.
 Blythe, M. G., 63.
 Bock, H. J., 17.
 Boeger, E. A., 4.
 Boerner, E. G., 15.
 Boettcher, A. B., 26.
 Boger, H. H., 40.
 Bogue, R. H., 63.
 Boland, E. N., 59.
 Bole, S. J., 49.
 Bolley, H. L., 75.
 Bolton, R. R., 52.
 Boltz, G. E., 77.
 Bomberger, F. B., 60.
 Bomboy, J. W., 22.
 Bonazzi, A., 77.
 Bonnett, R. K., 55.
 Bonns, W. W., 42.
 Bonslagel, C. J., 65.
 Bonsteel, J. A., 23.
 Boord, C. E., 76.
 Booth, A., 52.
 Booth, N. O., 78.
 Borden, A. D., 24.
 Borden, M. W., 59.
 Borders, J. M., 41.
 Boring, A. M., 59.
 Borland, A. A., 86.
 Boss, A., 63.
 Bosworth, A. W., 73.
 Bothell, F. H., 8.
 Botto, B. M., 36.
 Bouquet, A. G. B., 78.
 Bourne, A. I., 60.
 Boutelle, F. C., 63.
 Bouyoucos, G. J., 61.
 Boving, A. G., 25.
 Bowen, A. F., 74.
 Bowen, J. T., 8.
 Bowen, J. W., 52.
 Bower, H. J., 55.
 Bower, L. J., 23.
 Bowie, E. H., 6.
 Bowles, P. S., 65.
 Bowman, A. E., 92.
 Bowman, R. L., 58.
 Bownocker, J. A., 76.
 Boyack, B., 44.
 Boyce, J. S., 14.
 Boyd, L. T., 71.
 Boyd, T. D., 58.
 Boyd, W. E., 28.
 Boyd, W. L., 63.
 Boyden, B. L., 24.
 Boykin, L. E., 31.
 Boyle, C. W., 3.
 Boyle, J. G., 51.
 Boyle, M., 19.
 Boys, W. A., 55.
 Bracken, A. F., 85.
 Bracker, E. M. D., 78.
 Brackett, E. E., 68.
 Brackett, R. N., 82.
 Bradford, H. E., 68.
 Bradlee, T., 86.
 Bradley, C. A., 46.
 Bradley, J. C., 71.
 Bradley, J. W., 25.
 Bradley, M. A., 87.
 Bragg, L. C., 44.
 Bragg, T., 39.
 Brainard, A. S., 31.
 Braman, W. W., 81.
 Branch, F. H., 4.
 Branch, G. V., 33.
 Brand, C. J., 16, 32, 35.
 Brandenburg, F. H., 6, 7.
 Brandon, L. B., 82.
 Brandt, I. L., 52.
 Brandt, P. M., 66.
 Branham, R. H., 67.
 Brann, J. W., 90.
 Brannon, M. A., 48.
 Branson, E. B., 66.
 Branson, E. C., 35.
 Brashear, C. E., 52.
 Brauns, D. H., 19.
 Brawley, S., 40.
 Bray, G. E., 55.
 Breazeale, J. F., 21.
 Bredt, D. H., 80.
 Breed, R. S., 73.
 Bregger, T., 49.
 Brehme, H. H., 70.
 Breithaupt, L. R., 15, 78.
 Brett, C. E., 70.
 Brett, G. W., 10.
 Breuckner, A. L., 57.
 Brew, J. D., 73.
 Brewer, F. W., 8.
 Brewster, C. M., 88.
 Brewster, C. S., 78.
 Brewster, J. F., 18.
 Bridgeforth, G. R., 40.
 Brierley, W. G., 63.
 Briggs, L. J., 16.
 Briggs, R. R., 7.
 Brinkley, E. H., 60.
 Brinkley, L. L., 74.
 Brinton, C. S., 21.
 Brinton, P. M., 41.
 Briscoe, C. F., 65.
 Briscoe, J. M., 59.
 Britton, W. E., 45.
 Brodie, D. A., 4.
 Bronson, D. D., 10.
 Brooks, C., 14.
 Brooks, C. F., 4.
 Brooks, F. E., 24.
 Brooks, H. B., 78.
 Brooks, M. W., 40.
 Brooks, T. J., 65.
 Brooks, W. F., 31.
 Brooks, W. P., 60.

- Broome, F. H., 83.
 Broomell, A. W., 21.
 Broughten, M. P., 55.
 Broughton, L. B., 60.
 Brown, A. M., 61.
 Brown, B. E., 14.
 Brown, B. S., 59.
 Brown, C. B., 17.
 Brown, C. E., 63.
 Brown, Ch. E., 63.
 Brown, C. F., 85.
 Brown, C. J., 58.
 Brown, C. W., 61.
 Brown, D. E., 15.
 Brown, E., 16.
 Brown, E. A., 30.
 Brown, E. B., 15.
 Brown, F. H., 76.
 Brown, F. L., 55.
 Brown, G. A., 61.
 Brown, G. L., 83.
 Brown, H., 35, 36.
 Brown, H. B., 65.
 Brown, H. D., 49.
 Brown, H. H., 19.
 Brown, J. G., 41.
 Brown, L. A., 67.
 Brown, L. L., 60.
 Brown, M. E., 68.
 Brown, N. A., 13.
 Brown, P. E., 52.
 Brown, W. G., 66.
 Brown, W. S., 79.
 Browne, T. E., 74.
 Brubaker, H. W., 55.
 Bruce, E. S., 10.
 Brumley, O. V., 76.
 Brundage, A. J., 44.
 Bruner, L., 68.
 Brunner, J., 25.
 Brunson, A. M., 49.
 Brush, W. D., 12.
 Bryan, E. A., 88, 93.
 Bryan, H., 22.
 Bryan, M. K., 13.
 Bryant, E. S., 11.
 Bryant, T. R., 57.
 Bryant, V. C., 42.
 Bryant, W. T., 84.
 Buchanan, J., 52.
 Buchanan, J. H., 52.
 Buchanan, R. E., 52.
 Buchanan, W. A., 52.
 Buchanan, W. S., 40.
 Buchbinder, H. E., 19.
 Buck, C. J., 13.
 Buck, J. E., 39.
 Buck, J. L., 87.
 Buck, J. M., 9.
 Buckley, J. P., jr., 60.
 Buckley, J. S., 9.
 Buckley, S. S., 60.
 Buckman, H. C., 71.
 Buckman, R. M., 57.
 Buckner, G. D., 57.
 Buell, T. W., 84.
 Bulkley, G. S., 80.
 Bull, A. M., 63.
 Bull, C. P., 63.
 Bull, M. L., 63.
 Bull, S., 49.
 Bullard, W. G., 69.
 Bunch, M., 49.
 Bundy, C. E., 77.
 Bunnell, Mrs. D. L., 42.
 Bunнемeyer, B., 7.
 Bunzel, H. H., 15.
 Burd, J. S., 42.
 Burdick, H., 81.
 Burdick, R. T., 86.
 Burgess, A. F., 25.
 Burgess, C. H., 61.
 Burgess, J. M., 82.
 Burgess, P. S., 48.
 Burghart, L. M., 59.
 Burke, E., 67.
 Burke, H. E., 25.
 Burke, L. B., 84.
 Burke, R. T. A., 23.
 Burleson, D. J., 35, 39.
 Burling, H. A., 52.
 Burlingame, G. E., 81.
 Burlingham, C. L., 8, 68.
 Burlison, W. L., 49.
 Burmeister, C. A., 33.
 Burn, R. R., 23.
 Burnett, E. A., 68, 93.
 Burnett, L. B., 19.
 Burnett, L. C., 15, 52.
 Burns, C. A., 78.
 Burns, F., 10.
 Burns, G. P., 86.
 Burns, J. C., 84.
 Burns, W. H., 17.
 Burr, W., 55.
 Burr, W. W., 17.
 Burrage, F. S., 92.
 Burrell, B. H., 31.
 Burrill, A. C., 90.
 Burritt, M. C., 71.
 Burrows, T. K., 26.
 Burson, W. M., 46.
 Burt, F. A., 61.
 Burt, G. J., 15.
 Burt, J. H., 55.
 Burton, E. F., 8, 92.
 Busck, A., 25.
 Bush, H. M., 63.
 Bushey, A. L., 51.
 Bushnell, L. D., 55.
 Bushnell, T. M., 23.
 Russ, W. J., 77.
 Butler, H. P., 82.
 Butler, O. M., 13.
 Butler, O. R., 69.
 Butt, N. I., 85.
 Rutterfield, E. C., 18.
 Butterfield, H. M., 42.
 Butterfield, K. L., 60, 93.
 Buxton, B., 55.
 Ryall, S., 58.
 Byars, L. P., 14.
 Byrnes, E. M., 17.
 Cadwallader, J. M., 58.
 Cady, LeR., 63.
 Cady, W. B., 81.
 Caffey, F. G., 3.
 Caffrey, D. J., 23.
 Cage, S., 78.
 Cain, G. D., 58.
 Caine, G. B., 85.
 Caine, J. T., III, 85.
 Cairry, F. W., 52.
 Cajori, F. A., 16.
 Caldwell, A. B., 83.
 Caldwell, D. W., 81.
 Caldwell, J. S., 39.
 Caldwell, L., 55.
 Caldwell, R. E., 51.
 Caldwell, Mrs. R. C., 67.
 Calhoun, F. H. H., 82.
 Calkins, K., 90.
 Call, H., 76.
 Call, L. E., 55.
 Calland, J. W., 77.
 Calloway, C. J., 40.
 Calvert, E. B., 5.
 Calvert, S., 66.
 Calvin, J. A., 46.
 Calvin, J. W., 68.
 Calvin, P. H., 82.
 Cameron, F. K., 22.
 Cameron, H. C., 52.
 Cammack, F. R., 8.
 Camp, W. R., 74.
 Campbell, A. B., 16.
 Campbell, A. L., 92.
 Campbell, C. R., 89.
 Campbell, H. C., 9.
 Campbell, J., 52.
 Campbell, J. P., 46.
 Campbell, J. Phil, 46.
 Campbell, L. H., 52.
 Campbell, M., 81.
 Campbell, R. E., 24.
 Campbell, T. M., 40.
 Campbell, W. A., 83.
 Campbell, W. G., 21.
 Cance, A. E., 35, 60.
 Cannon, C. L., 15.
 Cannon, H. B., 67.
 Cantwell, J. W., 78.
 Cantwell, W. F., 63.
 Card, L. E., 44.
 Cardiff, I. D., 88.
 Cardon, P. V., 15.
 Cardozo, F. H., 46.
 Carey, D. H., 42.
 Carleton, M. A., 15.
 Carlyle, W. L., 78.
 Carmichael, B. E., 77.
 Carmichael, W. J., 49.
 Carmody, J. H., 57.
 Carothers, J. N., 22.
 Carpenter, C. E., 44.
 Carpenter, C. H., 32.
 Carpenter, C. W., 14.
 Carpenter, D. C., 61.
 Carpenter, I. W., 65.
 Carpenter, J. W., jr., 65.
 Carr, R. G., 61.
 Carr, R. H., 51.
 Carrero, J. O., 28, 81.
 Carrier, L., 16.

- Carroll, C. C., 7.
 Carroll, C. G., 41.
 Carroll, W. E., 85.
 Carroll, W. P., 15.
 Carruth, F. E., 74.
 Carsner, E., 87.
 Carter, B., 84.
 Carter, D. M., 26.
 Carter, E. E., 11.
 Carter, G. G., 51.
 Carter, L. M., 46.
 Carter, N., 66.
 Carter, W. T., jr., 23.
 Carver, G. W., 40.
 Cary, A., 11.
 Cary, C. A., 39.
 Casey, A. M., 88.
 Cash, E. K., 14.
 Cash, L. C., 13.
 Cassel, C. E., 55.
 Cassidy, H., 84.
 Cate, C. C., 79.
 Cates, H. R., 16.
 Cates, J. S., 4.
 Cathcart, C. S., 70.
 Catlin, C. N., 41.
 Catlin, P., 63.
 Caudell, A. N., 25.
 Cauthen, E. F., 39.
 Cavanaugh, G. W., 71.
 Cecil, G. H., 13.
 Center, O. D., 48.
 Chace, E. M., 19.
 Chaffee, R. R., 80.
 Chamberlain, F. W., 61.
 Chamberlin, J. S., 60.
 Chamberlin, T. R., 23.
 Chambers, W. E., 16, 35.
 Chambliss, C. E., 15.
 Chambliss, H., 78.
 Champlain, A. D., 25.
 Champlin, M., 83.
 Chandler, B. A., 86.
 Chandler, E., 78.
 Chandler, W. H., 71.
 Chapin, A. S., 51.
 Chapin, L. J., 79.
 Chapin, R. M., 7.
 Chaplin, E. L., 8.
 Chapman, C. W., 61.
 Chapman, G. H., 60.
 Chapman, J. W., 25.
 Chapman, N. E., 63.
 Chappel, G. M., 7.
 Charles, V. K., 14.
 Charlton, H. G., 87.
 Charlton, I. D., 88.
 Chase, A., 16.
 Chase, C. F., 75.
 Chase, L. W., 68.
 Chassignac, E. T., 36.
 Checkley, J. H., 49.
 Chenoweth, W. W., 60.
 Chernoff, L. H., 18.
 Chestnut, V. K., 19.
 Chewning, J. W., 84.
 Cheyney, E. G., 63.
 Chidester, F. E., 70.
 Chilcott, E. C., 16.
 Chilcott, E. F., 17.
 Childers, L. F., 66.
 Childs, O. W., 31.
 Childs, R. R., 15, 46.
 Chinn, A., 57.
 Chipman, M. E., 47.
 Chittenden, A. K., 62.
 Chittenden, F. H., 24.
 Chrisman, W. G., 86.
 Christensen, F. W., 71.
 Christian, R. V., 55.
 Christiansen, A. H., 42.
 Christie, G. I., 51, 93.
 Christman, C. H., 58.
 Christopher, C., 18.
 Christy, E. S., 87.
 Chrysler, M. A., 59.
 Chubbuck, L., 4.
 Chupp, C., 71.
 Church, C. G., 19.
 Church, J. E., jr., 69.
 Church, L., 4.
 Churchill, G. W., 73.
 Churchill, O. O., 75.
 Cille, M., 32.
 Clapp, A. L., 55.
 Clapp, C. H., 41.
 Clapp, E. H., 12.
 Clapp, S. C., 74.
 Clark, A. J., 62.
 Clark, A. L., 70.
 Clark, A. W., 73.
 Clark, C. C., 5.
 Clark, C. E., 74.
 Clark, C. F., 17.
 Clark, C. H., 15.
 Clark, D. B., 51.
 Clark, F. D., 21.
 Clark, H. H., 4.
 Clark, J. A., 15.
 Clark, J. S., 59.
 Clark, L. C., 47.
 Clark, L. D., 42.
 Clark, O. L., 60.
 Clark, O. M., 82.
 Clark, R. R., 87.
 Clark, S. C., 30.
 Clark, S. P., 55.
 Clark, V. E., 52.
 Clark, W. D., 60.
 Clark, W. M., 8.
 Clarke, W. F., 46.
 Clarke, W. T., 42.
 Clausen, C. P., 42.
 Clausen, R. E., 42.
 Clawson, A. B., 9, 15.
 Clayton, F. P., 65.
 Clayton, H. G., 46.
 Cleary, F. J. P., 26.
 Clem, R. R., 52.
 Clemens, L., 62.
 Clemens, W. A., 71.
 Clement, C. E., 8.
 Clement, G. E., 12, 25.
 Clemmer, P. W., 8.
 Cleveland, C. R., 69.
 Clevenger, C. B., 49.
 Clevenger, W. L., 76.
 Cleworth, E. B., 63.
 Cline, I. M., 6, 7.
 Cline, L. E., 18.
 Clink, C. H., 51.
 Clinton, G. P., 45.
 Clinton, L. A., 30.
 Close, C. P., 17.
 Clothier, G. L., 88.
 Clothier, R. W., 4.
 Clutter, J. A., 84.
 Coad, B. R., 23.
 Coates, C. E., 58.
 Cobb, C. A., 65.
 Cobb, G. R., 81.
 Cobb, N. A., 16.
 Cobb, T. B., 23.
 Cobleigh, W. M., 67.
 Coburn, C. E., 35.
 Cochel, W. A., 55.
 Cochran, D. C., 81.
 Cocks, R. P., 86.
 Cockrell, J. L., 40.
 Coe, H. S., 16.
 Coerper, F., 90.
 Coffey, J. S., 76.
 Coffey, W. C., 49.
 Coffman, E. E., 78.
 Cogswell, W. F., 22.
 Coit, J. E., 42.
 Colburn, C. E., 16.
 Colburn, F. E., 52.
 Colby, A. S., 49.
 Colcord, M., 23.
 Cole, A. D., 76.
 Cole, A. H., 90.
 Cole, C. G., 52.
 Cole, F. R., 24.
 Cole, G. M., 16.
 Cole, H. S., 7.
 Cole, J. S., 17.
 Cole, K., 60.
 Cole, L. J., 90.
 Cole, R. M., 52.
 Cole, V. E., 45.
 Coleman, G. A., 42.
 Coleman, J. G., 18.
 Coleman, T. A., 51.
 Collett, R. W., 74.
 Collins, C. W., 25.
 Collins, G. N., 15.
 Collins, J. F., 14.
 Collins, J. H., 33.
 Collins, P. M., 79.
 Collins, W. D., 19.
 Collison, R. C., 73.
 Collison, S. E., 46.
 Colver, C., 48.
 Colwell, R. H., 89.
 Combs, S., 74.
 Comfort, W. E., 32.
 Comstock, A. B., 71.
 Comstock, J. H., 71.
 Comstock, L., 61.
 Condit, I. J., 42.

- Condra, G. E., 68.
 Cone, V. M., 32, 44.
 Conger, A. C., 62.
 Conlin, H. J., 71.
 Conn, H. J., 73.
 Connaway, J. W., 66.
 Conner, A. B., 84.
 Conner, L. E., 60.
 Conner, S. D., 51.
 Connolly, E. L., 21.
 Connor, L. G., 4.
 Connor, M., 17.
 Connors, C. H., 70.
 Conolly, H. M., 17.
 Conover, C., 18.
 Conradi, A. F., 82.
 Conrey, G., 90.
 Conroy, E. H., 62.
 Conser, H. N., 59.
 Converse, J. E., 83.
 Conway, T. J., 84.
 Conway, W. T., 71.
 Conybeare, S. E., 52.
 Cooch, L. H., 45.
 Cook, A. S., 70.
 Cook, F. C., 18.
 Cook, G. H., 67.
 Cook, I. S., jr., 89.
 Cook, I. W., 48.
 Cook, L. B., 8.
 Cook, M. T., 70.
 Cook, O. F., 14.
 Cook, R. B., 85.
 Cooke, E., 59.
 Cooledge, L. H., 62.
 Cooley, A. C., 71.
 Cooley, F. S., 67.
 Cooley, J. S., 14.
 Cooley, R. A., 67.
 Cooley, R. B., 81.
 Coons, G. H., 62.
 Coons, S., 61.
 Cooper, B., 85.
 Cooper, E. H., 74.
 Cooper, F. F., 70.
 Cooper, J. J. W., 16, 35.
 Cooper, J. R., 68.
 Cooper, M. O., 4.
 Cooper, M. R., 4.
 Cooper, S. W., 32.
 Cooper, T. P., 75.
 Coopersmith, S., 19.
 Cooter, J. E., 79.
 Coover, W. F., 52.
 Cope, R. P., 88.
 Copson, G. V., 79.
 Corbett, L. C., 17, 18.
 Corbett, L. L., 4.
 Corbett, L. S., 59.
 Corbin, L. F., 68.
 Corbould, M., 77.
 Cordley, A. B., 78.
 Corneliussen, T., 8.
 Cornman, E., 26.
 Cory, E. N., 60.
 Cory, V. L., 84.
 Costello, M., 44.
 Costelloe, M. F. P., 52.
 Cotton, J. S., 4.
 Cotton, W. E., 10.
 Coughlin, J. W., 87.
 Coulter, J. L., 89.
 Coulter, S., 51.
 Courtney, O. K., 84.
 Cousley, E. T., 44.
 Coverdale, James W., 52.
 Coverdale, John W., 52.
 Coville, F. V., 16.
 Cowan, J., 68.
 Cowart, I. E., 84.
 Cowell, A. W., 80.
 Cowen, T. N., 40.
 Cowgill, H., 79.
 Cowgill, H. B., 81.
 Cowgill, Mrs. T. W., 69.
 Cowgill, W. N., 70.
 Cowles, I. F., 55.
 Cox, H. J., 6.
 Cox, H. L., 74.
 Cox, J. F., 62.
 Cox, J. H., 15.
 Cox, J. L., 55.
 Cox, R. E., 85.
 Cox, W. P., 13.
 Crabb, G. A., 46.
 Crabill, C. H., 86.
 Crabtree, P. E., 55.
 Craig, A. H., 88.
 Craig, H. K., 31.
 Craig, R. A., 51.
 Craig, W. T., 15, 72.
 Craighead, F. C., 25.
 Cramer, W., jr., 83.
 Crampton, G. C., 61.
 Crandall, C. S., 49.
 Crandall, W. T., 49.
 Crane, H. L., 89.
 Crawford, F. N., 73.
 Crawford, N. A., 55.
 Crawley, C. J., 22.
 Crawley, H., 9.
 Cray, W. A., 70.
 Creel, C. W., 23.
 Creese, M., 60.
 Creswell, C. F., 32.
 Creswell, M. E., 29.
 Crider, F. J., 82.
 Crippen, T. D., 28, 40.
 Crisler, O. S., 57.
 Criswell, J. H., 18.
 Crittenden, R. L., 35, 36.
 Crocheron, B. H., 42.
 Crockett, W. H., 86.
 Cromer, C. O., 51.
 Cromwell, R. C., 74.
 Cron, A. B., 16.
 Crooks, F. B., 80.
 Croot, J. V., 71.
 Crosby, C. R., 72.
 Crosby, L. S., 81.
 Crosby, M. A., 4.
 Cross, L. J., 72.
 Crossland, W. A., 31.
 Crossman, S. S., 25.
 Crouse, R. W., 87.
 Cruess, W. V., 42.
 Cruickshank, R. B., 76.
 Crumb, S. E., 23.
 Crumbine, S. J., 22.
 Crumley, J. J., 77.
 Crutcher, W. H., 46.
 Cullen, J. A., 22.
 Culley, F. H., 52.
 Culver, J. J., 25.
 Cummings, M. B., 86.
 Cunningham, C. C., 55.
 Cunningham, J. C., 52.
 Cunningham, O. C., 76.
 Cunningham, W. S., 41.
 Currie, J. N., 8.
 Currie, R. P., 25.
 Currier, E. L., 67.
 Currin, R. E., 82.
 Curry, B. E., 69.
 Curtice, C., 9.
 Curtis, A. W., 89.
 Curtis, E. W., 17.
 Curtis, H. E., 57.
 Curtis, M. R., 59.
 Curtis, O. F., 72.
 Curtis, R. S., 74.
 Curtis, R. W., 72.
 Curtis, W. C., 66.
 Curtiss, C. F., 52.
 Cushman, R. A., 24.
 Cutler, C., 51.
 Daane, A. N., 78.
 Dachnowski, A. P., 14.
 Dacy, A. L., 89.
 Dadtisman, A. J., 4, 89.
 Dahlberg, A. O., 8.
 Dahlberg, R. C., 63.
 Daily, F. X., 21.
 Dale, J. K., 17, 19.
 Dales, J. S., 68.
 Dalrymple, W. H., 58.
 Dalton, C. F., 22.
 Danel, J. W., 67.
 Damon, S. C., 81.
 Dana, S. T., 12.
 Daniels, A. L., 90.
 Daniels, A. M., 32.
 Daniels, H. O., 44.
 Daniels, L. C., 57.
 Darlington, H. T., 62.
 Darnell, A. L., 84.
 Darnell, E. M., 40.
 Darner, R., 75.
 Darrow, G. M., 17.
 Darst, W. H., 80.
 Daudt, H. W., 20.
 Davenport, E., 49, 93.
 Davidson, J., 21.
 Davidson, J. B., 42.
 Davidson, R. J., 86.
 Davidson, W. M., 24.
 Davies, A. L., 30.
 Davies, H., 57.
 Davis, B., 79.
 Davis, B. J., 8.
 Davis, C. C., 82.
 Davis, E. A., 46.
 Davis, E. G., 72.
 Davis, F. A., 31.

- Davis, G. J., 87.
 Davis, G. L., 45.
 Davis, H. L., 168.
 Davis, H. P., 8.
 Davis, H. S., 46.
 Davis, I. W., 45.
 Davis, J. E., 42.
 Davis, J. J., 23, 51.
 Davis, L. M., 42.
 Davis, L. V., 23.
 Davis, M. (Kans.), 55.
 Davis, M. (Wis.), 90.
 Davis, Mary E., 40.
 Davis, Minnie E., 40.
 Davis, N. J., 69.
 Davis, R. O. E., 22.
 Davis, T. W., 65.
 Davis, V. H., 76.
 Davisson, E. R., 68.
 Dawson, R. W., 68.
 Day, C. A., 59.
 Day, J. E., 76.
 Day, L. E., 9.
 Day, P. C., 5.
 Deal, E., 49.
 Dean, A. L. (Hawaii), 47.
 Dean, A. L. (Ky.), 57.
 Dean, E., 72.
 Dean, F. C., 68.
 Dean, G. A., 55.
 Dean, W. S., 16, 35.
 Deardorff, C. E., 66.
 Dearing, C. T., 17.
 DeBaun, R. W., 70.
 Dechant, H. P., 4.
 Deemer, R. B., 51.
 Deering, A. L., 59.
 Deeter, E. B., 23.
 De Gryse, J. J., 25.
 DeLoach, R. J. H., 47.
 Delwiche, E. J., 90.
 Demarest, W. H. S., 70.
 Demuth, G. S., 25.
 Dennis, S. C., 60.
 Dennis, S. J., 17.
 Dennison, H. E., 62.
 Denniss, F. H., 8.
 Denny, J. A., 42.
 Denson, L. A., 7.
 Denton, M. C., 76.
 Deputy, G. W., 45.
 de Regt, A. C., 70.
 Derrick, B. B., 23.
 Desmuke, W., 40.
 Detjen, L. R., 74.
 Dettlefsen, J. A., 49.
 Detmers, F., 76.
 De Turk, E., 80.
 Dewar, E. S., 74.
 de Werff, H. A., 49.
 Dewey, G. W., 17.
 Dewey, L. H., 16.
 Deysher, E. F., 8.
 de Zeeuw, R., 62.
 Dick, R., 76.
 Dickens, A., 55.
 Dickenson, R. W., 49.
 Dickerson, I. W., 49.
 Dickey, J. R. B., 23.
 Dickinson, L. P., 81.
 Dickson, M. E., 90.
 Dickson, R. E., 84.
 Didlake, M. LeG., 57.
 Dieffrenbach, R., 12.
 Diesem, H. C., 32.
 Dietrich, W., 63.
 Digges, D. D., 87.
 Dillingham, F. T., 47.
 Dillman, A. C., 16.
 Dillon, M. N., 44.
 Dimock, W. W., 53.
 Dinsmore, S. C., 22, 69.
 Dirstine, P. H., 88.
 Ditlewig, G., 9.
 Divelbiss, E. H., 71.
 Dixon, H. M., 4.
 Doane, C. F., 8.
 Doane, D. H., 66.
 Dobbins, J. T., 74.
 Dobbs, E. C., 40.
 Dodderidge, R. R., 67.
 Dodds, L. S., 66.
 Dodge, C. O., 19.
 Dodge, H. E., 55.
 Dodge, J. H., 31.
 Dodge, L. G., 4.
 Dodson, W. R., 58, 93.
 Doleini, V. F., 42.
 Dolman, A. M., 79.
 Dolt, M. L., 75.
 Donaldson, N. C., 15.
 Donaldson, O. M., 40.
 Doneghue, R. C., 75.
 Donk, M. G., 20.
 Donovan, R. L., 63.
 Doolittle, R. E., 21.
 Doran, E. B., 58.
 Dorchester, C., 53.
 Dore, W. H., 42.
 Dorman, J. E., 8.
 Dorner, H. B., 49.
 Dorset, M., 7.
 Dorsett, P. H., 18.
 Dorsey, H., 89.
 Dorsey, M. J., 63.
 Doryland, C. J. T., 75.
 Dosé, F. C., 81.
 Doten, S. B., 69.
 Doty, H. S., 53.
 Doty, S. W., 34.
 Doubleday, R. S., 57.
 Dougherty, J. E., 42.
 Dougherty, P. E., 80.
 Douglass, A. E., 41.
 Douglass, E., 44.
 Douglass, H. H., 42.
 Douglass, T. R., 53.
 Dove, W. E., 25.
 Dovener, W. M., 24.
 Dow, B. K., 44.
 Dowling, O., 22.
 Downing, G. J., 48.
 Downing, J. E., 46.
 Dox, A. W., 53.
 Doyle, C. B., 15.
 Doyle, E. S., 16.
 Downey, U. J., 8.
 Drain, H. D., 65.
 Drake, C. J., 76.
 Drake, J. A., 4.
 Drake, O. P., 55.
 Draper, A. E., 18.
 Drescher, H. A., 90.
 Drew, J. M., 63.
 Drinkard, A. W., jr., 87.
 Drisdale, C. B., 85.
 Drummond, B., 14.
 Dryden, J., 79.
 Du Bois, C., 13.
 Duckett, A. B., 24.
 Dudley, J. B., 75.
 Dudley, J. E., jr., 24.
 Duggar, J. F., 39, 93.
 Duke, J. W., 22.
 Duley, F. L., 66.
 Dunbar, B. A., 83.
 Dunbar, P. B., 19.
 Duncan, L. N., 39.
 Duniway, C. A., 92.
 Dunlap, F., 66.
 Dunlop, G., 53.
 Dunn, A. C., 31.
 Dunn, J. E., 23.
 Dunn, R., 53.
 Dunn, R. C., 84.
 Dunning, C. W., 33.
 Dunnington, S., 87.
 Duntion, L., 55.
 Durand, E. D., 63.
 Durand, E. J., 66.
 Durant, A. J., 66.
 Durham, C. B., 51.
 Durham, S. B., 8.
 Durrant, E. P., 76.
 Durst, C. E., 49.
 Dutcher, R. A., 79.
 Dutton, W. C., 62.
 Duval, L., 15.
 Duvel, J. W. T., 15.
 Dvorachek, H. E., 41.
 Dyar, H. G., 25.
 Dyer, C. L., 17.
 Dyer, D. C., 8.
 Dykstra, R. R., 55.
 Dynes, O. W., 72.
 Eakins, H. S., 44.
 Eames, A. J., 72.
 Earhart, R. F., 76.
 Earl, D. L., 90.
 Earle, D. E., 16, 35, 36.
 Easley, C. W., 59.
 Eason, F. G., 32.
 Eastham, R. F., 31.
 Eastman, A. S., 18.
 Eastman, E. E., 53.
 Eastman, W. E., 62.
 Eastwood, G. R., 77.
 Eaton, C. W., 59.
 Eaton, W. H., 74.
 Ebersol, E. T., 49.
 Eberson, F., 53.

- Eckhardt, C. M., 90.
 Eckhardt, W. G., 49.
 Eckles, C. H., 66.
 Eckman, O. L., 69.
 Eckmann, E. C., 23.
 Edgerton, C. W., 58.
 Edgerton, P. R., 51.
 Edmister, F. H., 82.
 Edmiston, H. D., 80.
 Edmond, H. D., 44.
 Edmonds, J. L., 49.
 Edmonston, W. D., 25.
 Edmundson, C. S., 48.
 Edmundson, W. C., 48.
 Edison, H. A., 14.
 Edwards, H., 81, 93.
 Edwards, R. W., 16, 84.
 Edwards, W. E. J., 62.
 Edwards, W. G., 80.
 Egbert, A. D., 85.
 Eggleston, J. D., 86.
 Eggleston, W. W., 15.
 Ehlers, J. H., 84.
 Eichhorn, A., 9.
 Eichling, H. L., 53.
 Ekblaw, K. J. T., 49.
 Elder, D., 81.
 Eldredge, B. R., 8, 85.
 Eldridge, J. H., 31.
 Eldridge, M. O., 31.
 Elkins, M. W., 81.
 Ellenberger, H. B., 72.
 Ellenberger, W. P., 8.
 Ellenwood, C. W., 77.
 Ellett, W. B., 87.
 Eling, C. G., 55.
 Ellington, E. V., 48.
 Elliot, F. L., 20.
 Elliott, H. M., 84.
 Elliott, N. R., 76.
 Elliott, P., 76.
 Ellis, B. W., 61.
 Ellis, D. C., 10.
 Ellis, O. L., 49.
 Ellison, A. D., 15.
 Elser, W. L., 51.
 Elwood, C. F., 42.
 Elwood, P. H., jr., 61.
 Emberson, R. H., 66.
 Embody, G. C., 72.
 Emerson, F. V., 58.
 Emerson, R. A., 72.
 Emerson, R. L., 18.
 Emery, J. A., 7, 36.
 Emery, W. O., 19.
 Emery, W. T., 23.
 Emmett, A. D., 49.
 Ende, C. L. von, 49.
 Enders, H. E., 51.
 Enger, A. L., 41.
 Englis, D. T., 49.
 Enlows, E. M., 13.
 Epple, W. F., 51.
 Erb, E. S., 80.
 Erf, O., 76.
 Erickson, L. W., 31.
 Erickson, T. A., 63.
 Ericson, A., 63.
 Erwin, A. T., 53.
 Espe, K., 53.
 Essary, S. H., 83.
 Essig, E. O., 42.
 Estabrook, L. M., 27.
 Estelle, H. S., 85.
 Esten, W. M., 44.
 Estil, J. S., 58.
 Eswine, H. E., 76.
 Etheridge, J. I., 90.
 Etheridge, W. C., 46.
 Etherton, W. A., 32.
 Etters, D. B., 51.
 Eubank, M., 89.
 Eustace, H. J., 62.
 Evans, A. C., 8.
 Evans, A. D., 67.
 Evans, A. M., 35.
 Evans, A. R., 66.
 Evans, B. V., 65.
 Evans, E. A., 7.
 Evans, F. N., 49.
 Evans, J. A., 29.
 Evans, J. O., 15.
 Evans, M., 78.
 Evans, M. O., 79.
 Evans, M. W., 16.
 Evans, N. S., 75.
 Evans, P., 67.
 Evans, P. N., 51.
 Evans, R. J., 85.
 Evans, S. W., 82.
 Evans, W. H., 28.
 Evans, W. L., 76.
 Evenson, O. L., 19.
 Everett, G. A., 72.
 Evvard, J. M., 53.
 Ewan, A. E., 57.
 Ewell, A. D., 85.
 Ewell, Mrs. R. L., 85.
 Ewing, A. L., 63.
 Ewing, C. O., 20.
 Ewing, D. T., 62.
 Ewing, H. E., 53.
 Ewing, P. A., 32.
 Ewing, P. V., 47.
 Fabis, A. I., 24.
 Fagan, F. N., 80.
 Fagan, M. E., 10.
 Fahrnkopf, H. F. T., 49.
 Fain, J. R., 46.
 Fairbanks, H. S., 31.
 Fairchild, D., 18.
 Fairchild, E. T., 69.
 Falconer, J. I., 76.
 Fansler, O. N., 27.
 Farley, A. J., 70.
 Farnham, F. H., 8.
 Farra, J. A., 57.
 Farrar, R. K., 53.
 Farrar, S. K., 20.
 Farrell, F. D., 18.
 Farrell, G. E., 30.
 Farrell, J. J., 22.
 Farrington, A. M., 9.
 Farrington, E. H., 90.
 Fassig, O. L., 7.
 Fawntleroy, J. D., 31.
 Faurot, F. W., 66.
 Faust, E. L., 87.
 Faville, A. D., 92.
 Fawcett, H. S., 42.
 Fay, L. E., 83.
 Fecht, E. E., 55.
 Fedde, M. S., 68.
 Feeley, R. O., 82.
 Felps, C. I., 55.
 Fenn, F. A., 13.
 Fenn, H. E., 13.
 Fenton, F. C., 53.
 Fenwick, I. H., 87.
 Fergus, H., 8.
 Ferguson, C. W., 39.
 Ferguson, J. A., 80.
 Ferguson, R. H., 61.
 Ferguson, W. C., 88.
 Fergusson, S. P., 69.
 Fernald, C. H., 61.
 Fernald, H. T., 61.
 Ferrin, E. F., 53.
 Ferris, E. B., 65.
 Ferris, L. W., 19.
 Ferry, E. L., 45.
 Ferry, E. S., 51.
 Fewell, L., 55.
 Field, O. J., 36.
 Fields, W. S., 41.
 Filley, H. C., 68.
 Filley, W. O., 45.
 Finch, B. F., 31.
 Finch, V. C., 4.
 Fink, D. E., 24, 87.
 Fink, G. J., 72.
 Fippen, E. O., 72.
 Firor, G. W., 46.
 Firor, J. W., 46.
 Fish, D., 53.
 Fishback, B. L., 63.
 Fishburn, H. P., 48.
 Fisher, A. K., 26.
 Fisher, D. F., 14.
 Fisher, F. A., 49.
 Fisher, G., 53.
 Fisher, J. W., jr., 33.
 Fisher, M. L., 51.
 Fisher, O. S., 49.
 Fisher, W. I., 72.
 Fisher, W. J., 69.
 Fisher, W. R., 72.
 Fisher, W. S., 25.
 Fisk, W. W., 72.
 Fiske, F. C., 86.
 Fiske, R. J., 24.
 Fitch, C. L., 53.
 Fitch, J. B., 55.
 Fitch, W. Q., 51.
 Fite, A. B., 71.
 Fitterer, J. C., 92.
 Fitts, E. B., 79.
 Fitts, F. O., 82.
 Fitz, L. A., 22, 55.
 Fitzgerald, N., 53.
 Fitzpatrick, H. M., 72.

- Fitzpatrick, W. W., 8, 82.
 Fitz-Randolph, R. B., 22.
 Fleming, B., 72.
 Fleming, G., 49.
 Fleming, J., 8.
 Fleming, R. M., 14.
 Fletcher, C. C., 22.
 Fletcher, W. F., 17.
 Flint, E. R., 46.
 Flocken, C. F., 9.
 Flohr, L. B., 33.
 Florell, V. H., 15.
 Flory, C. H., 13.
 Flossfeder, F. C. H., 42.
 Floyd, B. F., 46.
 Floyd, E. V., 55.
 Floyd, W. L., 46.
 Fluharty, L. W., 4.
 Flynn, W. F., 72.
 Fogle, F. E., 62.
 Folker, A., 55.
 Foltz, L. S., 44.
 Foord, J. A., 61.
 Foote, W. M., 78.
 Forbes, E. B., 77.
 Forbes, R. H., 41.
 Forbes, S. A., 49.
 Forbush, E. H., 61.
 Forbush, W. C., 81.
 Ford, C. M., 67.
 Ford, J. C., 39.
 Formad, R. J., 9.
 Forman, L. W., 53.
 Forrester, D. R., 78.
 Forst, L. B., 21.
 Fortier, S., 32.
 Foster, J. H., 69.
 Foster, L., 71.
 Foster, W. D., 9.
 Foubert, C. L., 15.
 Foulk, C. W., 76.
 Foust, J., 22.
 Fowlds, M., 83.
 Fowler, F. H., 13.
 Fowler, W. L., 78.
 Fox, D. S., 4, 72.
 Fox, H., 23.
 Fox, P. J., 22.
 Fracker, S. B., 90.
 Frame, N. T., 89.
 Francis, C. K., 78.
 Francis, G., 30.
 Francis, M., 84.
 Francis, R. L., 35, 36.
 Franck, E. A., 53.
 Frandsen, J. H., 68.
 Frandsen, P., 69.
 Frankenfield, H. C., 6.
 Franklin, H. J., 61.
 Franklin, O. M., 55.
 Frantz, A. E., 21.
 Fraps, G. S., 84.
 Frary, G. G., 22.
 Fraser, A. C., 72.
 Fraser, J. H., 53.
 Fraser, W. J., 49.
 Frazier, J. S., 47.
 Frear, D. W., 75.
 Frear, W., 80.
 Fred, E. B., 90.
 Frederick, E. L., 74.
 Frederick, H. J., 85.
 Fredholm, A., 81.
 Freeborn, S. B., 42.
 Freeman, B., 32.
 Freeman, E. M., 36, 63, 93.
 Freeman, F. R., 59.
 Freeman, G. F., 41.
 French, F., 71.
 French, H. T., 44.
 French, N. A., 59.
 French, W. H., 62, 93.
 Freret, R. A., 36.
 Frescoln, S. W., 32.
 Frevert, G. E., 8.
 Frey, R. W., 20.
 Fricke, F. H., 22.
 Frier, G. M., 51.
 Fries, J. A., 81.
 Frisbee, J. B., 69.
 Frissell, H. B., 87.
 Fritz, C. M., 77.
 Froelich, P., 33.
 Fromme, F. D., 87.
 Fromme, N. K., 83.
 Froning, H. B., 76.
 Frost, H. B., 42.
 Frost, W. D., 90.
 Frost, W. S., 61.
 Frothingham, E. H., 12.
 Fry, W. H., 22.
 Fryhofer, C. W., 8.
 Fuchs, W. R., 26.
 Fugett, J. R., 40.
 Fuller, F. D., 51.
 Fuller, H. B., 30.
 Fuller, J. G., 90.
 Fuller, J. M., 78.
 Fuller, P. E., 32.
 Fulmer, E., 88.
 Fulmer, H., 90.
 Fulton, B. B., 73.
 Fulton, E., 78.
 Fulton, H. R., 74.
 Fulton, K. V., 85.
 Funchess, M. J., 39.
 Funk, W. C., 4.
 Furber, F. B., 21.
 Futrall, J. C., 41.
 Gaddie, M. C., 58.
 Gaddis, L. R., 51.
 Gaessler, W. G., 53.
 Gage, G. E., 61.
 Gahan, A. B., 23.
 Gail, A. D., jr., 33.
 Gail, F. W., 48.
 Gain, J. H., 68.
 Gaines, B. B., 46.
 Gaines, E. F., 88.
 Gaimey, P. L., 55.
 Galbreath, M., 31.
 Gallagher, B. A., 9.
 Galloway, B. T., 71.
 Galpin, C. J., 90.
 Galpin, S. L., 53.
 Gamble, A. D., 89.
 Gamble, J. A., 8.
 Garcia, F., 71.
 Gardiner, R. F., 22.
 Gardner, F. D., 80.
 Gardner, J. J., 49.
 Gardner, V. R., 79.
 Garland, J. J., 90.
 Garman, H., 57.
 Garner, W. W., 15.
 Garnett, W. E., 35.
 Garin, G. M., 74.
 Garrett, C. L., 72.
 Garrett, F. W., 49.
 Garrett, J. B., 58.
 Garrety, W. P., 30.
 Garrigus, H. L., 44.
 Garrison, H. S., 15.
 Garver, S., 16.
 Garvin, A. L., 51.
 Garvin, M. L., 76.
 Garwood, R. S., 81.
 Gaskill, E. F., 61.
 Gasser, G. W., 28, 40.
 Gates, B. N., 61.
 Gates, F. H., 23.
 Gates, L. M., 68.
 Gates, O. H., 4.
 Gates, W. H., 58.
 Gatewood, R., 55.
 Gault, F. M., 22.
 Gearhart, C. A., 77.
 Gearhart, W. S., 55.
 Gee, E. C., 84.
 Gehrand, G. W., 63.
 Geib, W. J., 23.
 Geiger, G. A., 18.
 Geisert, B. F., 66.
 Gentle, G. E., 49.
 George, C. R., 51.
 George, D. C., 88.
 George, L. R., 51.
 Georger, E. L., 57.
 Georgeson, C. C., 28, 40.
 Georgia, A. E., 72.
 Gericke, W. F., 42.
 Gerlaugh, P., 80.
 Gernert, W. B., 49.
 Gettemy, W. S., 53.
 Getty, R. E., 16, 55.
 Gibbens, E., 39.
 Gibson, A. M., 60.
 Gibson, E. H., 23.
 Gibson, J. A., 66.
 Giddings, N. J., 89.
 Gieseke, L. F., 67.
 Gilbert, A. G., 87.
 Gilbert, A. H. (Ind.), 51.
 Gilbert, A. H. (Ky.), 57.
 Gilbert, A. W., 72.
 Gilbert, E. O., 16.
 Gilbert, G. A., 8.
 Gilbert, G. B., 15.
 Gilbert, J. C., 33.
 Gilbert, W. W., 14.
 Gilbertson, G., 83.

- Gilbertson, H. W., 30.
 Gile, P. L., 28, 81.
 Giles, J. K., 46.
 Gilkerson, H. C., 49.
 Gilkey, R., 72.
 Gill, J. B., 24.
 Gillespie, L. J., 14.
 Gillespie, W. C., 80.
 Gillett, G. P., 63.
 Gillette, C. P., 44.
 Gillette, L. S., 53.
 Gillison, B., 82.
 Gilmore, A., 87.
 Gilmore, J. U., 23.
 Gilmore, J. W., 42.
 Gilson, W. I., 62.
 Giltner, L. T., 9.
 Giltner, W., 62.
 Gingery, J. B., 66.
 Girault, A. A., 25.
 Girtton, E. S., 39.
 Given, G. C., 80.
 Gladwin, F. E., 73.
 Glaisyer, H. R., 79.
 Glascock, E. C., 32.
 Glaser, R. W., 25.
 Glasgow, H., 73.
 Glasgow, R., 55.
 Glasson, E. J., 28.
 Glover, G. H., 44.
 Gloyer, W. O., 73.
 Gobble, C. F., 51.
 Goddard, L. H., 30.
 Godfrey, G. H., 15.
 Godin, F. J., 82.
 Golden, M. E., 40.
 Goldenweiser, E. A., 4.
 Goldthwaite, N. E., 49.
 Goll, F. L., 14.
 Good, E. S., 57.
 Goodale, H. D., 61.
 Goodell, C. J., 46.
 Goodling, C. L., 80.
 Goodman, A. L., 23.
 Goodman, A. M., 8.
 Goodnow, E. H., 21.
 Goodrich, C. E., 20.
 Goodrich, C. L., 4.
 Goodrich, H. R., 53.
 Goodspeed, W. E., 85.
 Goodwin, J. A., 82.
 Goodwin, O. T., 46.
 Goodwin, W. H., 77.
 Gordon, C. E., 61.
 Gordon, C. H., 83.
 Gordon, H. B., 84.
 Gordon, J. H., 32.
 Gordon, R. A., 65.
 Gordon, W. O., 21.
 Gore, H. C., 17, 19.
 Gorham, W. R., 80.
 Gortner, R. A., 63.
 Goss, A., 51.
 Goss, L. W., 55.
 Goss, W. L., 16.
 Gossard, H. A., 77.
 Gott, E. J., 57.
 Goucher, E., 18.
 Gould, H. P., 17.
 Gould, L. H., 55.
 Gourley, J. H., 69.
 Gow, R. M., 41.
 Grab, E. G., 19.
 Graber, L. F., 90.
 Grace, O. J., 17.
 Grady, J. R., 90.
 Graf, J. E., 24.
 Graham, C. K., 87.
 Graham, J. C., 61.
 Graham, J. J. T., 20.
 Graham, K. H., 46.
 Graham, R., 57.
 Graham, S. A., 72.
 Graham, W. A., 22.
 Graine, C. A., 40.
 Gramlich, H. J., 68.
 Granger, C. M., 13.
 Grant, E. H., 21.
 Grant, R. Q., 7.
 Grantham, A. E., 45.
 Grantham, G. M., 62.
 Grassick, C. E., 41.
 Graul, E. J., 90.
 Gravatt, G. F., 14.
 Graves, G. W., 48.
 Graves, H. S., 10.
 Graves, L. E., 46.
 Graves, R. R., 79.
 Gravitt, W. T., 40.
 Gray, C. E., 49.
 Gray, D. T., 74.
 Gray, F. J., 65.
 Gray, G., 49.
 Gray, G. P., 42.
 Gray, J. C., 80.
 Greathouse, C. H., 26.
 Greathouse, L. H., 22.
 Greaves, J. E., 85.
 Greeley, W. B., 11.
 Green, C. R., 61.
 Green, G. R., 80.
 Green, H. L., 55.
 Green, R. L., 51.
 Green, R. M., 66.
 Green, S. P., 87.
 Green, W. J., 77.
 Green, W. W., 87.
 Greenbank, W. K., 77.
 Greene, C. T., 25.
 Greene, C. W., 40.
 Greene, G. O., 55.
 Greene, L., 53.
 Greenfield, E., 55.
 Greenhalgh, V., 85.
 Greenlee, A. D., 21.
 Gregg, C. J., 82.
 Gregg, J. W., 42.
 Gregg, Ralph, 53.
 Gregg, Roy, 53.
 Gregory, C. T., 72.
 Gregory, H. W., 83.
 Gregory, W. B., 32.
 Gribben, R. L., 53.
 Gridley, R. M., 46.
 Griffin, E. L., 20.
 Griffin, F. L., 79.
 Griffith, C. L., 90.
 Griffith, D. C., 32, 35.
 Griffith, L. C., 25.
 Griffiths, D., 16.
 Griggs, R. F., 76.
 Griggs, W. D., 17.
 Grimes, M. F., 80.
 Grindley, H. S., 49.
 Griswold, D. J., 66.
 Gromer, S. D., 66.
 Groshon, M., 22.
 Gross, E. R., 44.
 Gross, L. G., 72.
 Grossenbacher, J. G., 14.
 Grossman, J. D., 53.
 Groth, M., 70.
 Grotlisch, V. E., 20.
 Grover, E. L., 62.
 Grover, O. L., 31.
 Groves, A. M., 18.
 Grunsky, H. W., 32.
 Guard, W. F., 53.
 Guernsey, J. E., 42.
 Guilbeau, P. L., 58.
 Guild, F. N., 41.
 Gulley, A. G., 44.
 Gulliver, H. G., 59.
 Gunderson, A. J., 49.
 Gunderson, O., 90.
 Gunn, R. V., 90.
 Gunness, C. I., 61.
 Gunson, T., 62.
 Guptill, W. T., 22.
 Gurdy, M. W., 59.
 Guseman, S. R., 89.
 Gusler, G., 76.
 Gustafson, A. F., 49.
 Guthrie, C. T., 75.
 Guthrie, D. V., 58.
 Guthrie, E. S., 72.
 Guthrie, J. E., 53.
 Gutsche, F. C., 55.
 Haas, A. R., 80.
 Hackedorn, H., 66.
 Hackleman, J. C., 66.
 Haddock, L. J., 85.
 Haddon, C. B., 65.
 Hadley, C. H., jr., 72.
 Hadley, F. B., 90.
 Hadley, G., 75.
 Hadley, M. B., 46.
 Hadley, P. B., 82.
 Haecker, T. L., 63.
 Hagan, H. R., 85.
 Hagans, O. C., 55.
 Hageman, A. M., 70.
 Hagen, A. L., 71.
 Haggard, M. J., 63.
 Haggart, M. H., 55.
 Hahner, A. R., 48.
 Haigh, L. D., 66.
 Haire, D. G., 31.
 Haley, D. E., 80.
 Hall, A. G., 32, 65.
 Hall, E. C., 23.
 Hall, F. H., 73.

- Hall, H. M., 42.
 Hall, I. W., 32.
 Hall, L. D., 34, 36.
 Hall, L. S., 31.
 Hall, M. C., 9.
 Hall, O. E., 55.
 Hall, W. L., 12, 13.
 Hall, W. M., 58.
 Hall, W. N., 32.
 Halligan, C. P., 62.
 Hallman, E. T., 62.
 Hallsted, A. L., 17, 55.
 Halpin, J. G., 90.
 Halsted, B. D., 70.
 Ham, F. W., 67.
 Hamilton, E. W., 48.
 Hamilton, J., 53.
 Hamilton, John, 93.
 Hamilton, J. F., 66.
 Hamilton, J. G., 71.
 Hamilton, J. M., 67, 93.
 Hamilton, J. O., 55.
 Hammer, B. W., 53.
 Hammerly, J. M., 15.
 Hammond, H. J., 8.
 Hammond, H. S., 79.
 Hammond, J. W., 77.
 Hammond, R. L., 59.
 Hammond, W. F., 7, 86.
 Hamnett, F. S., 72.
 Hampson, C. B., 48.
 Hampton, T. M., 67.
 Hanawalt, D. C., 68.
 Hand, W. F., 22, 65.
 Handschin, W. F., 49.
 Handy, R. B., 26.
 Haney, A., 72.
 Hanford, J. G., 32.
 Hanger, W. E., 76.
 Hansen, A. A., 80.
 Hansen, A. W., 21.
 Hansen, D., 17.
 Hansen, N. E., 83.
 Hansen, W., 22.
 Hanson, E. O., 63.
 Hanson, H. H., 59.
 Hanson, P., 53.
 Haralson, C., 63.
 Hard, H. A., 75.
 Harden, F. G., 32.
 Hardenburg, E. V., 72.
 Hardin, M. B., 82.
 Harding, H. A., 50.
 Harding, S. T., 32.
 Harding, T. S., 19.
 Harding, W. F., 26.
 Hardison, R. B., 23.
 Hardy, J. I., 83.
 Hare, C. L., 39.
 Hare, F. C., 82.
 Hargreaves, S., 86.
 Hargrove, H. H., 58.
 Haring, C. M., 42.
 Harker, M. D., 55.
 Harkins, L. A., 67.
 Harlan, H. V., 15.
 Harman, C. E., 22.
 Harman, M. T., 55.
 Harned, H. H., 65.
 Harned, R. W., 65.
 Harper, C., 50.
 Harper, J. D., 51.
 Harper, J. N., 82.
 Harper, M. W., 72.
 Harrington, F. M., 53.
 Harrington, G. T., 16.
 Harris, F. S., 85.
 Harris, G. W., 15.
 Harris, J. M., 59.
 Harris, J. T., 12.
 Harris, M. L., 85.
 Harris, N. L., 55.
 Harris, R. T., 90.
 Harris, W. G., 87.
 Harrison, A. K., 61.
 Harrison, B. M., 53.
 Harrison, C. T., 31.
 Harrison, F., 50.
 Harrison, M., 55.
 Harrison, R. H., 31.
 Harriss, O., 83.
 Hart, B. R., 21.
 Hart, E. B. (N. C.), 74.
 Hart, E. B. (Wis.), 90.
 Hart, G. A., 32.
 Hart, H. B., 53.
 Hart, J. C., 87.
 Hart, J. H., 87.
 Hart, L. C., 46.
 Hart, R. A., 32.
 Hart, W. R., 61.
 Hartenbower, A. C., 29, 47.
 Harter, G. A., 45.
 Harter, L. L., 14.
 Hartgering, G., 83.
 Hartley, C. H., 89.
 Hartley, C. P., 15.
 Hartley, Carl P., 14.
 Hartman, L. W., 69.
 Hartman, M. L., 66.
 Hartman, W. J., 67.
 Hartsuch, B. E., 62.
 Hartwell, B. L., 81.
 Hartwell, F. E., 7.
 Hartzell, F. Z., 73.
 Harvey, B. T., 25.
 Harvey, E. M., 14.
 Harvey, F. L., 11.
 Harvey, L. E., 72.
 Harvey, T. W., 51.
 Hasbrouck, P. B., 61.
 Haseman, L., 66.
 Hasen, W., 23.
 Haskell, C. G., 32.
 Haskell, E. S., 4.
 Haskell, R. J., 72.
 Haskell, S. B., 61.
 Haskins, H. D., 61.
 Haslam, T. P., 55.
 Hassall, A., 9.
 Hasse, C. H., 14.
 Hasselbring, H., 15.
 Hastings, E. G., 90.
 Hastings, S. H., 17.
 Haswell, J. R., 32.
 Hatch, A. V., 62.
 Hatch, K. L., 90.
 Hathaway, A. S., jr., 31.
 Hathaway, E. O., 31.
 Hathaway, M. C., 76.
 Hathorn, I., 63.
 Hatton, J. H., 13.
 Hauser, A. J., 53.
 Hauser, M. A. (Iowa), 53.
 Hauser, M. A. (N. J.), 70.
 Havenhill, M. H., 53.
 Havner, H. H., 80.
 Hawbaker, C. C., 33.
 Hawes, A. F., 86.
 Hawker, H. W., 23.
 Hawkes, A. H., 53.
 Hawkins, L. A., 15.
 Hawkins, M. A., 82.
 Hawks, E. B., 27.
 Hawley, I. M., 72.
 Hawthorne, H. W., 4.
 Hayden, A., 53.
 Hayden, C. C., 77.
 Hayden, C. J., 74.
 Hayden, H. E., jr., 84.
 Hayes, F. M., 42.
 Hayes, H. K., 63.
 Hayes, J. B., 90.
 Hayes, M. E., 45.
 Hayes, M. L., 84.
 Hayes, W. P., 55.
 Haynes, M. M., 44.
 Hays, M. E., 66.
 Hayward, H., 45.
 Haywood, J. K., 20, 36.
 Haywood, W. G., 74.
 Hazard, B. E., 72.
 Hazen, L. E., 72.
 Headden, W. P., 44.
 Headen, B. L., 46.
 Headle, T. J., 70, 71.
 Headley, F. B., 17.
 Headley, R., 13.
 Heald, F. D., 88.
 Healy, D. J., 57.
 Hean, C. S., 90.
 Hearn, W. E., 23, 74.
 Heaton, H. C., 66.
 Hebard, G. R., 92.
 Hechler, W. R., 53.
 Hecht, A. G., 50.
 Heck, C. M., 74.
 Hecke, G. H., 42.
 Hedgecock, G. G., 14.
 Hedger, H. R., 78.
 Hedges, C. C., 84.
 Hedges, F., 13.
 Hedrick, U. P., 73.
 Heidel, B. F., 31.
 Heideman, C. W., jr., 40.
 Heideman, W. H., 48.
 Heidemann, O., 25.
 Heil, H. G., 76.
 Heim, A. L., 12.
 Heinicke, A. J., 72.
 Heinrich, C., 25.

- Helzer, D. E., 32.
 Helder, G. K., 55.
 Hellams, R. V., 16, 35.
 Helm, C. A., 68.
 Helme, J. W., 22.
 Helme, N., 82.
 Helmreich, J. A., 44.
 Helpenstine, R. K., jr., 12.
 Helyar, J. P., 70, 71.
 Hemphill, R. G., 32.
 Henderson, L. B., 83.
 Henderson, M. P., 79.
 Henderson, W. C., 3.
 Hendley, H. W., 31.
 Hendren, L. L., 46.
 Hendrick, A. W., 69.
 Hendrickson, A. H., 42.
 Hendrickson, N., 21.
 Hendrix, W. J., 76.
 Hendry, G. W., 42.
 Henkel, A., 16.
 Hennis, C. M., 4, 75.
 Henry, A. J., 5.
 Henry, D. H., 82.
 Henry, H. M., 16.
 Henry, W. A., 90.
 Henry, W. M., 45.
 Hensel, F. W., jr., 84.
 Henshaw, H. W., 26.
 Hepburn, J. S., 21.
 Hepburn, N. W., 50.
 Hepburn, W. M., 51.
 Hepler, J. R., 90.
 Hepner, F. E., 92.
 Hepworth, L. G., 55.
 Herger, A. W., 4.
 Herms, W. B., 42.
 Herrick, G. W., 72.
 Herrick, R. S., 53.
 Herrmann, C. F. von, 7.
 Herron, L. E., 87.
 Herron, L. G., 78.
 Herron, V., 77.
 Hersey, H. B., 7.
 Hershberger, J. P., 76.
 Hesler, L. R., 72.
 Hess, O. B., 8.
 Hetzel, H. C., 53.
 Hetzel, R. D., 78, 93.
 Hewes, L. I., 31.
 Hewitt, A. R., 90.
 Hewitt, J. L., 41.
 Hibbard, B. H., 90.
 Hibbard, P. L., 42.
 Hibbard, R. P., 62.
 Hibshman, E. K., 80.
 Hickman, C. W., 48.
 Hickman, R. W., 9.
 Hicks, J. F. G., 78.
 Hieronymus, R. E., 50.
 Hiers, J. L., 58.
 Higbie, E. C., 63.
 Higgins, B. B., 47.
 Higgins, J. E., 28, 48.
 Higgins, J. J., 22.
 Higgins, L. A., 8.
 High, M. M., 24.
 Hightower, G. R., 65.
 Hildebrandt, A. F., 80.
 Hilgard, E. W., 42.
 Hill, A. R., 66, 93.
 Hill, C. C., 23.
 Hill, C. J., 42.
 Hill, C. O., 83.
 Hill, D. H., 74.
 Hill, F. E., 42.
 Hill, G. R., jr., 85.
 Hill, H., 89.
 Hill, H. H., 87.
 Hill, I. W., 29.
 Hill, J. A., 92.
 Hill, J. B., 78.
 Hill, M. E., 72.
 Hill, R. G., 74.
 Hill, Mrs. W. G., 47.
 Hillman, F. H., 16.
 Hillman, F. M., 8.
 Hills, F. B., 45.
 Hills, J. L., 86, 93.
 Hills, T. L., 80.
 Hills, T. M., 76.
 Hiltner, R. S., 21.
 Hilts, R. W., 21.
 Hilyer, J. V., 46.
 Himmelberger, L. R., 57.
 Himmelein, L. L., 62.
 Hinds, W. E., 39.
 Hine, G. S., 55.
 Hine, J. S., 76.
 Hingston, N. L., 67.
 Hiramman, A. L., 46.
 Hirst, C. T., 85.
 Hisaw, F. L., jr., 66.
 Hislop, W., 88.
 Hitch, H. J., 60.
 Hitchcock, A. S., 16.
 Hitchcock, K. M., 79.
 Hitchings, E. F., 59.
 Hite, B. C., 16.
 Hite, B. H., 89.
 Hoagland, D. R., 42.
 Hoagland, R., 7.
 Hobbs, C. W., 55.
 Hobson, A., 90.
 Hobson, I. L., 92.
 Hockett, E., 76.
 Hodges, J. T., 85.
 Hodgkiss, H. E., 73.
 Hodgson, A. N., 87.
 Hodgson, E. R., 87.
 Hodson, E. A., 74.
 Hoff, E. J., 32.
 Hoffer, G. N., 51.
 Hoffman, M. H., 53.
 Hoffman, R. H., jr., 22.
 Hofmann, F. W., 36.
 Hogan, A. G., 55.
 Hogenson, J. C., 85.
 Hogg, L. J., 23.
 Hoke, C. E., 4.
 Holaday, H. A., 48.
 Holben, F. J., 80.
 Holdaway, C. W., 87.
 Holden, J. A., 17.
 Holden, R. J., 87.
 Holding, W. A., 83.
 Holland, E. B., 61.
 Hollinger, A. H., 66.
 Hollis, A. P., 75.
 Hollister, B. M., 62.
 Hollister, S. P., 45.
 Hollway, T. E., 23.
 Holman, H. P., 20.
 Holmes, A., 69.
 Holmes, A. D., 30.
 Holmes, F. S., 60.
 Holmes, L. C., 23.
 Holmes, O. W., 48.
 Holmes, R. E., 16.
 Holmes, R. M., 59.
 Holmes, W., 77.
 Holt, E. G., 47.
 Holt, S. V., 50.
 Holt, V. S., 28, 48.
 Holton, E. L., 55.
 Holtz, H. F., 88.
 Hood, C. E., 25.
 Hood, G. W., 68.
 Hood, S. C., 15.
 Hooker, W. A., 28.
 Hooper, A. L., 31.
 Hooper, J. J., 57.
 Hooper, J. K., 86.
 Hoover, G. W., 21.
 Hoover, J. M., 48.
 Hopkins, A. D., 24.
 Hopkins, A. W., 90.
 Hopkins, C. G., 50.
 Hopkins, H. C., 40.
 Hopkins, H. J., 61.
 Hopper, H. A., 72.
 Hoppert, E. H., 68.
 Hopt, E., 68.
 Horne, W. T., 42.
 Horton, J. R., 24.
 Hoskins, E. E., 50.
 Hoskins, H. P., 63.
 Hosmer, R. S., 72.
 Hostetter, A. B., 63.
 Hotchkiss, W. S., 84.
 Hottes, A. C., 72.
 Houck, U. G., 8.
 Houghton, C. O., 45.
 Houghton, H. W., 18.
 House, E. B., 44.
 Houser, J. S., 77.
 Houser, T., 77.
 Houston, D. F., 3.
 Howard, B. J., 20.
 Howard, C. G., 85.
 Howard, C. W., 63.
 Howard, D. C., 79.
 Howard, G. F., 63.
 Howard, J. T., 61.
 Howard, L. O., 23.
 Howard, L. P., 82.
 Howard, R. F., 68.
 Howard, R. M., 34.
 Howard, W. L., 42.
 Howe, F. B., 53.
 Howe, G. H., 73.
 Howe, H. C., 7.

- Howe, R. W., 23.
 Howe, W. E., 8.
 Howell, L. G., 4.
 Howell, W. H., 8, 47.
 Hoy, H. H., 83.
 Hoyt, T. C., 13.
 Hubbard, P., 31.
 Hubbard, W. S., 19.
 Huber, H. F., 45.
 Hubert, B. F., 82.
 Huckle, C., 21.
 Hudelson, R. R., 66.
 Hudson, C. R., 74.
 Hudson, C. S., 18.
 Hudson, E. W., 14.
 Hudson, R. S., 62.
 Huff, C. L., 88.
 Hughes, E. H., 66.
 Hughes, H. D., 53.
 Hughes, J. A., 88.
 Hughes, J. L., 45.
 Hughes, J. S., 55.
 Hulbert, R., 77.
 Hulce, R. S., 50.
 Humbert, E. P., 71.
 Humbert, J. G., 77.
 Hume, A. N., 83.
 Humes, L. D., 44.
 Hummel, W. G., 42.
 Humphrey, C. J., 12, 14.
 Humphrey, G. C., 90.
 Humphrey, H. B., 15.
 Humphrey, H. N., 4.
 Humphrey, J. R., 34.
 Humphreys, Le G., 85.
 Humphreys, W. J., 6.
 Hundertmark, R. E., 88.
 Hungerford, De F., 41.
 Hungerford, E. H., 83.
 Hunkins, H., 66.
 Hunn, A. E., 72.
 Hunn, C. E., 72.
 Hunn, C. J., 81.
 Hunt, A., 62.
 Hunt, A. E., 90.
 Hunt, C. H., 88.
 Hunt, C. L., 30.
 Hunt, F., 56.
 Hunt, L. W., 88.
 Hunt, N. R., 14.
 Hunt, R. E., 87.
 Hunt, T. F., 42, 93.
 Hunt, T. R., 42.
 Hunter, A. J., 51.
 Hunter, B., 4, 88.
 Hunter, O. W., 56.
 Hunter, W. D., 23, 36.
 Hunting, H., 53.
 Huntington, F., 32.
 Hunziker, O. F., 51.
 Hurd, L. M., 72.
 Hurd, W. D., 60, 93.
 Hurley, M. I., 66.
 Hursey, L., 67.
 Hurst, L. A., 23.
 Husmann, F. L., 17.
 Husmann, G. C., 17.
 Huston, E., 57.
 Huston, R. C., 62.
 Hutcheson, J. R., 87.
 Hutcheson, T. B., 87.
 Hutchins, L. M., 14.
 Hutchinson, A. N., 71.
 Hutchinson, J., 50.
 Hutchinson, R. H., 25.
 Hutchinson, W. L., 82.
 Hutchison, C. B., 66.
 Hutchison, J. L., 76.
 Hutt, W. N., 74.
 Hutton, C. A., 8, 83.
 Hutton, F. Z., 23.
 Hutton, J., 44.
 Hutton, J. G., 83.
 Hutton, J. P., 62.
 Huyett, J. B., 89.
 Hyde, H., 48.
 Hyslop, G. R., 79.
 Hyslop, J. A., 23.
 Ibsen, H. L., 90.
 Iddings, E. J., 48.
 Illingworth, J. F., 47.
 Imes, M., 9.
 Ince, J. W., 75.
 Ingall, O. D., 25.
 Ingalls, E. L., 86.
 Ingalls, G. R., 90.
 Ingerson, H. J., 24.
 Ingle, M. J., 19.
 Ingram, E., 57.
 Ireland, H. A., 18.
 Irion, H., 11.
 Irons, W. C., 82.
 Irwin, G. W., 83.
 Irwin, R. F., 47.
 Isaac, E. E., 53.
 Isbell, P. C., 33.
 Isely, D., 24.
 Isham, C. S., 87.
 Israelsen, O. W., 42.
 Ives, F. W., 76.
 Jackley, J. G., 56.
 Jackson, A. M., 14.
 Jackson, C. F., 69.
 Jackson, E. E., 45.
 Jackson, F. A., 22.
 Jackson, F. H., jr., 31.
 Jackson, F. K., 86.
 Jackson, H. S., 51.
 Jackson, J. Q., 74.
 Jackson, J. W., 84.
 Jackson, R. C., 8.
 Jackson, S. C., 65.
 Jackson, V. T., 78.
 Jacob, M., 83.
 Jacobs, C., 16.
 Jacobson, C. A., 69.
 Jacobson, J. H., 17.
 Jacoby, F. S., 76.
 Jaffa, M. E., 42.
 Jager, F., 63.
 Jagger, I. C., 72.
 Jahr, M. E., 50.
 James, C., 70.
 James, E. J., 49.
 James, E. W., 31.
 James, J. A., 90.
 James, R. W., 58.
 Jamison, A. W., 50.
 Jamison, O. A., 59.
 Janssen, J. W., 31.
 Jardine, J. T., 11.
 Jardine, W. M., 55.
 Jarnagin, M. P., 47.
 Jarrell, T. D., 60.
 Jason, W. C., 45.
 Jayne, S. O., 4.
 Jefferies, J. H., 74.
 Jeffers, L. M., 15.
 Jeffries, R. R., 89.
 Jenison, J. S., 8.
 Jenkins, A. E., 14.
 Jenkins, E. H., 44, 45.
 Jenkins, E. M., 46.
 Jenkins, E. S., 15.
 Jenkins, J. M., 15.
 Jenkins, M., 21.
 Jenks, F. B., 86.
 Jenness, J. R., 56.
 Jennings, A. H., 25.
 Jennings, D. S., 72.
 Jennings, J. M., 58.
 Jennings, R. D., 4.
 Jennings, T. B., 7.
 Jennings, W. J., 65.
 Jennison, H. M., 67.
 Jensen, C. A., 16.
 Jensen, E. L., 63.
 Jensen, G. H., 88.
 Jensen, K., 67.
 Jensen, L. N., 17.
 Jensen, O. F., 62.
 Jesness, O. B., 34.
 Jessup, L. T., 32.
 Jewett, H. H., 57.
 Jobbins, D. M., 71.
 Jobson, H. H., 84.
 Jodidi, S. L., 15.
 Johannsen, O. A., 72.
 Johns, C. O., 18.
 Johnson, A. G., 15, 90.
 Johnson, C. E., 8, 48.
 Johnson, E., 32.
 Johnson, E. C., 55.
 Johnson, E. H., 51.
 Johnson, F. E., 68.
 Johnson, H. F., 86.
 Johnson, J., 90.
 Johnson, J. M. (Bu. Chem.), 19.
 Johnson, J. M. (Off. Sec., N. C.), 4.
 Johnson, M. C., 25.
 Johnson, M. O., 28, 48.
 Johnson, O. M., 89.
 Johnson, O. N., 90.
 Johnson, O. R., 66.
 Johnson, P. M., 24.
 Johnson, S. A., 44.
 Johnson, S. B., 41.
 Johnson, S. M., 23.
 Johnson, T. C., 87.
 Johnson, W. T., jr., 8.
 Johnston, A. D., 63.

- Johnston, Mrs. C. E., 27.
 Johnston, F. A., 24.
 Johnstone, G. R., 62.
 Jolivet, H. D. M., 14.
 Jones, A. T., 53.
 Jones, C. H. (S. C.), 83.
 Jones, C. H. (Vt.), 86.
 Jones, C. P., 61.
 Jones, C. R., 44.
 Jones, C. S., 18.
 Jones, D. F., 45.
 Jones, D. W., 25.
 Jones, E., 61.
 Jones, E. B., 46.
 Jones, E. E., 56.
 Jones, E. H., 56.
 Jones, E. I., 87.
 Jones, E. R., 90.
 Jones, G. B., 23.
 Jones, H. F., 8.
 Jones, H. M., 56.
 Jones, J. C., 69.
 Jones, J. D., 11.
 Jones, J. E., 13.
 Jones, J. M. (Texas), 84.
 Jones, J. M. (U. S. D. A.), 29.
 Jones, J. S., 48.
 Jones, J. W., 15.
 Jones, K. D., 43.
 Jones, K. K., 81.
 Jones, L. A., 32.
 Jones, L. L., 51.
 Jones, L. R., 90.
 Jones, L. V., 59.
 Jones, M. D., 59.
 Jones, O. B., 76.
 Jones, O. F., 17.
 Jones, O. L., 53.
 Jones, P. S., 32.
 Jones, R. C., 79.
 Jones, R. E., 45.
 Jones, R. K., 59.
 Jones, R. S., 67.
 Jones, R. W., 57.
 Jones, S. A., 27.
 Jones, S. C., 51.
 Jones, T. H., 24.
 Jones, V. R., 72.
 Jones, W. J., jr., 22, 51.
 Jones, W. P., 18.
 Jordan, B. T., 79.
 Jordan, E. L., 58.
 Jordan, W. H., 73, 93.
 Joseph, W. E., 50.
 Joslyn, H. L., 74.
 Juday, W. D., 90.
 Judisch, G., 53.
 Judkins, B. A., 23.
 Judkins, H. F., 45.
 Juenemann, H. E., 17.
 Jurney, R. C., 23, 74.
 Jurrjens, J. C., 90.
 Juve, O., 4.
 Juve, O. A., 91.
 Kable, G., 71.
 Kadel, B. C., 5.
 Kains, M. G., 80.
 Kaiser, W. G., 53.
 Kalkus, J. W., 88.
 Kamrass, B., 31.
 Karper, R. E., 78.
 Karraker, P. E., 57.
 Kastle, J. H., 57.
 Kauffman, T., 76.
 Kaupp, B. F., 74.
 Kause, R. L., 16, 36.
 Kays, D. J., 76.
 Kean, J. C., 65.
 Kearney, T. H., 16.
 Keatley, D., 79.
 Kebler, L. F., 19.
 Kedzie, F. S., 62.
 Kedzie, R. H., 53.
 Keeler, A., 58.
 Keeler, R. F., 73.
 Keenan, G. L., 20.
 Keene, E. S., 75.
 Keene, M. L., 66.
 Keffer, C. A., 83.
 Kehrli, F. W., 8, 79.
 Keim, F. D., 68.
 Keister, J. T., 19.
 Keith, M. H., 50.
 Keithley, J. R., 75.
 Keitt, G. W., 91.
 Keitt, T. E., 82.
 Keller, O. A., 50.
 Kellerman, K. F., 13, 36, 93.
 Kellerman, M., 14.
 Kelley, E. B., 91.
 Kelley, F. J., 91.
 Kelley, J. B., 53.
 Kelley, M. A. R., 66.
 Kelley, W. P., 43.
 Kellner, L. W., 32.
 Kellner, R. H., 19.
 Kellogg, E. H., 15.
 Kellogg, H. S., 53.
 Kellogg, W. L., 8.
 Kelly, A., 48.
 Kelly, E., 8.
 Kelly, E. O. G., 23.
 Kelly, J. P., 80.
 Kelly, J. W., 15.
 Kelly, W. A., 32.
 Kelsner, R. A., 9.
 Kelso, F. L., 17.
 Kemp, W. B., 89.
 Kempster, H. L., 66.
 Kempton, J. H., 15.
 Kendall, C. H., 31.
 Kendall, J. C., 69.
 Kendrick, W. H., 89.
 Kenety, W. H., 64.
 Kennard, F. L., 64.
 Kennedy, C., 64.
 Kennedy, C. N., 79.
 Kennedy, C. V., 75.
 Kennedy, G. W., 26.
 Kennedy, M. R., 87.
 Kennedy, P. B., 43.
 Kenney, F. C., 61.
 Kenney, R., 56.
 Kent, H. L., 56.
 Kent, O. B., 72.
 Kent, R. H., 19.
 Kephart, L. W., 16.
 Kerlin, I. B., 39.
 Kern, F. D., 80.
 Kern, O. J., 43.
 Kernan, C. B., 23.
 Kernkamp, H. C., 64.
 Kerr, A. P., 58.
 Kerr, C., 85.
 Kerr, E. W., 58.
 Kerr, J., 13.
 Kerr, J. A., 23.
 Kerr, W. H., 34, 36.
 Kerr, W. J., 78.
 Kewley, R. J., 23, 51.
 Keyes, H. F., 45.
 Keyser, A., 44.
 Kiah, T. H., 60.
 Kidder, A. F., 58.
 Kiene, F. A., jr., 15, 56.
 Kienholz, E. H., 88.
 Kiernan, J. A., 8.
 Kiesel, C. W., 48.
 Kieselbach, T. A., 68.
 Kildee, H. H., 53.
 Kile, O. M., 89.
 Kilgore, B. W., 74, 93.
 Kilham, A. D., 67.
 Killingsworth, C. E., 16, 35.
 Kilpatrick, E., 41.
 Kilpatrick, M. C., 80.
 Kimball, H. H., 6.
 King, C. J., 82.
 King, C. M., 53.
 King, F. G., 51.
 King, H. E., 40.
 King, H. H., 56.
 King, J. L., 77.
 King, W. J., 56.
 King, W. V., 25.
 Kingdon, J. T., 32.
 Kinghorn, P., 87.
 Kingman, H. E., 44.
 Kinman, C. F., 28, 81.
 Kinney, E. J., 57.
 Kinney, H. B., 53.
 Kinsman, C. D., 51.
 Kinzy, G., 60.
 Kiplinger, C. C., 53.
 Kirk, N. M., 23.
 Kirkpatrick, J. I., 56.
 Kirkpatrick, W. F., 45.
 Kirkwood, W. P., 64.
 Kjelson, A. A., 68.
 Klein, J. P., 33.
 Klein, M. A., 72.
 Kleinheinz, F., 91.
 Kleinsmid, R. B. von, 41.
 Klem, S. V., 62.
 Klinka, J. S., 91.
 Klopfer, H., 18.
 Knab, F., 25.
 Knapp, B., 29.
 Knapp, H., 53.
 Knapp, H. B., 72.
 Kneipp, L. F., 13.

- Knight, C. S., 69.
 Knight, E. H., 92.
 Knight, H. G., 92.
 Knight, H. L., 28.
 Knight, L. I., 89.
 Knight, O. D., 20.
 Knisely, A. L., 21.
 Knobel, E. W., 66.
 Knoll, F. P., 80.
 Knorr, F., 17, 68.
 Knowles, N. S., 53.
 Knowlton, H., 72.
 Knox, J. S., 41.
 Knudson, L., 72.
 Knudson, W. W., 72.
 Koehler, A. E., 23.
 Koebele, A., 48.
 Koeber, J., 43.
 Koehler, J. E., 82.
 Koenig, N. E., 53.
 Kolb, C. A., 11.
 Kolb, R. A., 91.
 Kolshorn, H., 92.
 Koonce, L. F., 74.
 Kostalek, J. A., 48.
 Kostir, W. J., 76.
 Kotinsky, J., 25.
 Krak, J. H. B., 89.
 Krall, J. A., 53.
 Kramer, E. W., 13.
 Kramer, W. H., 77.
 Kraus, E. J., 79.
 Krauss, F. G., 28, 48.
 Kraybill, H. R., 80.
 Kreckler, F. H., 76.
 Krum, W. G., 72.
 Krusekopf, H. H., 66.
 Kuhlman, A. H., 91.
 Kulp, W. L., 62.
 Kunerth, W., 53.
 Kunkel, L. O., 14.
 Kunst, F. B., 89.
 Kurtz, M. B., 43.
 Kuska, J. B., 17.
 Kuzirian, S. B., 53.
 Kyle, C. H., 15.
 Kyle, E. J., 84.
 Laake, E. W., 25.
 LaBach, J. O., 57.
 Lace, M., 44.
 Ladd, C. E., 72.
 Ladd, E. F., 22, 75.
 Ladd, G. E., 71.
 Ladd, J. E., 70.
 Lafrenz, F. H., 48.
 Lake, E. R., 17.
 Lamaster, J. P., 8.
 Lamb, A. R., 53.
 Lamb, C. C., 79.
 Lamb, G. N., 12.
 Lamb, W. H., 12.
 Lambert, D. J., 82.
 Lambert, F. A., 76.
 Lamon, H. M., 7.
 Lampe, W. H. G., 84.
 Lampson, L. M., 88.
 Lamson, G. H., jr., 45.
 Lamson, R. A., 51.
 Lamson, R. W., 20.
 Lamson-Scribner, F., 5.
 Landacre, F. L., 76.
 Landon, L. E., 62.
 Lane, C. H., 27, 28.
 Lane, D. J., 64.
 Lane, E. C., 48.
 Lane, F. P., 56.
 Lang, H. L., 28, 30.
 Lang, LeR., 50.
 Lang, M. W., 8.
 Langston, J. M., 23.
 Langworthy, A. E., 56.
 Langworthy, C. F., 28, 30.
 Lapham, J. E., 23.
 Lapham, M. H., 23.
 Larrimer, W. H., 23.
 Larsen, C., 83.
 Larsen, L. D., 48.
 Larsen, L. M., 53.
 Larson, C. W., 80.
 Larson, J. E., 79.
 Larson, M. S., 64.
 Larson, R. A., 83.
 Lashbrook, A. J., 8.
 Lassetter, W. C., 41.
 Lathrop, E. C., 14.
 Latshaw, W. L., 56.
 Latta, R. W., 8, 71.
 Latta, W. C., 51.
 Lattimer, W. J., 23.
 Laude, H. H., 84.
 Lauman, G. N., 72.
 Law, J. W., 33.
 Lawrence, E. A., 83.
 Lawrence, O. C., 51.
 Lawrence, W. H., 66.
 Laws, A. G., 65.
 Lawson, D. L., 58.
 Lawson, J. F., 4.
 Lawton, R. G., 7.
 Laycock, W. E., 62.
 Layman, J. D., 69.
 Lazenby, W. R., 76.
 Lea, E. J., 43.
 Leach, B. R., 24.
 Learn, C. D., 78.
 Lechner, H. J., 53.
 LeClair, C. A., 66.
 LeClerc, J. A., 21.
 Lecompte, T. R., 58.
 Lee, C. B., 68.
 Lee, J. A., 16.
 Lee, J. G., 58.
 Leech, E., 12.
 Leeper, L. L., 56.
 Lees, Fred, 3.
 Leete, B. A., 87.
 Lefevre, E., 20.
 Lefevre, G., 66.
 Legge, F. W., 26.
 Leggett, G. P., 62.
 Lehenbauer, P. A., 69.
 Lehmann, E. W., 53.
 Leiby, C. I., 48.
 Leidigh, A. H., 84.
 Leighton, V. L., 82.
 Leighty, C. E., 15.
 Leighty, W. R., 50.
 Leith, B. D., 91.
 Leland, E. W., 72.
 Leonard, L. T., 14.
 Leonard, M. D., 72.
 Lepper, H. A., 19.
 LeRoy, V. E., 62.
 Letteer, C. R., 15.
 Levin, I., 58.
 Levine, M., 53.
 Levister, B., 83.
 Lewis, C. I., 79.
 Lewis, D. E., 56.
 Lewis, E. M., 61.
 Lewis, H. D., 77.
 Lewis, H. G., 23.
 Lewis, H. R., 70, 71.
 Lewis, I. F., 66.
 Lewis, J. V., 70.
 Lewis, L. L., 78.
 Lewis, M., 70.
 Lewis, R. H., 31.
 Lewis, S. L., 79.
 Lewis, W. K., 8.
 Liepsner, F. W., 21.
 Liggett, J. A., 30.
 Lill, J. G., 17.
 Lincoln, M. D., 45.
 Lindemuth, J. R., 23.
 Lindgren, H. A., 79.
 Lindsey, J. B., 61.
 Linfield, F. B., 67, 93.
 Linford, J. H., 85.
 Link, G. K. K., 68.
 Linklater, W. A., 88.
 Linney, C. E., 7.
 Lintner, W. A., 45.
 Linton, F. B., 18.
 Linton, J. O., 62.
 Lipman, C. B., 43.
 Lipman, J. G., 70.
 Lipp, C. C., 83.
 Lippincott, A., 33.
 Lippincott, W. A., 56.
 Lippitt, W. F., 22.
 Lipscomb, G. F., 82.
 Lisher, P. R., 53.
 List, G. M., 44.
 Little, W. P., 7, 44.
 Liverance, W. B., 8.
 Livermore, J. R., 72.
 Livermore, K. C., 72.
 Livingston, A. E., 21.
 Livingston, G., 34.
 Lloyd, E. R., 65.
 Lloyd, J. H., 51.
 Lloyd, J. T., 72.
 Lloyd, J. W., 50.
 Lloyd, O. G., 53.
 Lloyd, W. A., 30.
 Lloyd, W. E., 43.
 Lloyd, R. K., 65.
 Lloyd-Jones, O., 53.
 Lobdell, R. E., 72.
 Lockwood, W. P. B., 61.
 Lodge, W. L., 62.

- Loeb, C. D., 66.
 Loftin, U. C., 23.
 Logan, C. C., 50.
 Logan, K. R., 53.
 Logan, W. N., 65.
 Lohnis, F., 14.
 Lombard, P. M., 17.
 Lommel, W. E., 51.
 Long, C. L., 70.
 Long, D. D., 47.
 Long, W. H., 14.
 Long, W. W., 82.
 Longley, A. T., 28, 48.
 Longley, L. E., 17.
 Longyear, B. O., 44.
 Loomis, A. M., 68.
 Loomis, H., 83.
 Loomis, H. M., 19.
 Lopez, F., 81.
 Lord, E. C. E., 31.
 Loree, R. E., 62.
 Lory, C. A., 44, 93.
 Losh, A. R., 56.
 Lothe, H. E., 91.
 Lotter, H. H., 31.
 Loughridge, R. H., 43.
 Lounsberry, C., 23.
 Love, H. H., 72.
 Loveland, G. A., 7, 68.
 Lovett, A. E., 79.
 Lovett, A. L., 79.
 Lowry, M. M., 89.
 Lowry, M. W., 47.
 Lowry, Q. S., 45.
 Lowry, R. B., 82.
 Loy, S. K., 92.
 Lubs, H. A., 8.
 Lucas, J. B., 87.
 Ludwig, C. A., 51.
 Lueder, C. A., 89.
 Luginbill, P., 23.
 Lumpkin, J. G., 67.
 Lumsden, D., 72.
 Lungren, E. L., 13.
 Lunn, A. G., 79.
 Lunn, W. M., 15.
 Lunz, H., 91.
 Lurie, A., 59.
 Lusk, W. F., 64.
 Lute, A. M., 16, 43.
 Luther, E. L., 91.
 Lutman, B. F., 86.
 Luttrell, E., 41.
 Lyman, J. F., 76.
 Lyman, R. P., 62.
 Lynch, J., 21.
 Lynch, W. D., 20.
 Lynch, W. H., 31.
 Lynde, H. M., 32, 74.
 Lyon, H. L., 48.
 Lyon, T. L., 72.
 Lyons, F. F., 43.
 Lyons, F. R., 81.
 McAdams, E. E., 84.
 McAdory, I. S., 39.
 McAleer, H. A., 21.
 McAllep, W. R., 48.
 McArthur, C. L., 41.
 McBeth, I. G., 14.
 McBryde, C. N., 7.
 McBryde, J. B., 87.
 McBryde, J. M., 87.
 McBurney, R., 79.
 McCain, A. C., 13.
 McCain, M. J., 78.
 McCall, A. G., 76.
 McCall, M. A., 88.
 McCall, T. M., 64.
 McCampbell, C. W., 56.
 McCampbell, E. F., 76.
 McCann, S. D., 57.
 McCheyne, G. M., 85.
 McChord, R. C., 53.
 McClain, J. H., 8.
 McClelland, C. K., 47.
 McClelland, T. B., 28, 81.
 McClintock, J. A., 87.
 McClintock, J. E., 76.
 McCloskey, A. G., 72.
 McClure, G. M., 76.
 McClure, H. B., 4.
 McClurg, N., 56.
 McColloch, J. W., 56.
 McCollum, E. V., 91.
 McComb, H. A., 68.
 McConnell, O. J., 32, 35.
 McConnell, W. R., 23.
 McConville, A. H., 4.
 McCool, M. M., 62.
 McCormick, A. C., 79.
 McCormick, E. B., 31.
 McCormick, F. A., 68.
 McCrary, M. L., 78.
 McCray, A. H., 25.
 McCreary, O., 73.
 McCrory, S. H., 32.
 McCue, C. A., 45.
 McCulloch, L., 13.
 McCulloch, T. B., 64.
 McDanell, L., 64.
 McDaniel, E. I., 62.
 McDaniel, J. S., 62.
 McDaniels, L. H., 72.
 McDonald, E. M., 66.
 McDonald, M. C., 66.
 McDonnell, C. C., 20.
 McDonnell, H. B., 60.
 McDonough, F. L., 23.
 McDowell, J. C., 4.
 McDowell, M., 64.
 McDowell, M. S., 80.
 McElroy, C. H., 78.
 McFarland, F. T., 57.
 McFarlin, J. W., 57.
 McGee, E. L., 85.
 McGee, W. J., 21.
 McGehee, T. F., 23.
 McGinty, R. A., 44.
 McGowan, D. F., 4.
 McGregor, E. A., 23.
 McGuire, A. J., 64.
 McGuire, L., 76.
 McHargue, J. S., 57.
 McHatton, T. H., 47.
 McHugh, J. K., 58.
 McIlhinney, A., 88.
 McIlwain, D. W., 65.
 McIndoo, N. E., 24.
 McInerny, T. J., 72.
 McIntire, W. H., 83.
 McIntosh, C. J., 79.
 McIntosh, D., 50.
 McIntyre, E. R., 91.
 McKay, A. B., 65.
 McKay, J. F., 65.
 McKay, L. J., 65.
 McKay, M. B., 14.
 McKee, C., 53.
 McKee, R., 16.
 McKee, R. H., 59.
 McKellip, I., 8.
 McKenney, R. E. B., 13.
 McKenzie, T. P., 13.
 McKerrow, W. A., 64.
 McKimmon, Mrs. C., 74.
 McKinney, W. H., Jr., 80.
 McLane, J. W., 16.
 McLaughlin, A. J., 22.
 McLaughlin, F. A., 61.
 McLaughlin, W. W., 32.
 McLean, H. C., 70.
 McLean, J. A., 61.
 McLendon, C. A., 82.
 McLendon, W. E., 23.
 McMillan, J. G., 68.
 McMillan, S. A., 84.
 McMiller, P. R., 64.
 McMurdo, G. A., 15.
 McMurrin, S. M., 14.
 McMurtry, H. D., 65.
 McFair, A. D., 4.
 McFall, P. E., 56.
 McFeely, L. R., 71.
 McNeill, R., 51.
 McFess, G. T., 84.
 McNutt, J. C., 74.
 McOmie, A. M., 41.
 McPheeters, W. H., 84.
 McPherson, R. J., 46.
 McPherson, W., 76.
 McQuarrie, C. K., 46.
 McRae, W. A., 21.
 McVeety, E., 75.
 McWilliams, J. E., 92.
 Maberry, Mrs. E. N., 59.
 MacCaughy, V., 47.
 MacComber, O. B., 64.
 MacDonald, G. B., 53.
 MacDonald, M. B., 80.
 MacDonald, P., 80.
 Mack, M. B., 69.
 Mack, R. R., 43.
 Mack, W. B., 69.
 MacKay, C. J., 53.
 MacKaye, B., 12.
 MacKellar, W. M., 8.
 MacKinnon, J. G., 53.
 Mackintosh, R. S., 64.
 Macmorland, E. E., 66.
 Macpherson, H., 34, 79.
 Macy, E. J., 56.
 Madella, O. C., 60.
 Madsen, R. M., 92.
 Madson, B. A., 43.

- Magee, W. T., 84.
 Magoon, C. A., 88.
 Magoon, C. H., 82.
 Magruder, D. G., 43.
 Mair, W. M., 83.
 Mairs, T. I., 80.
 Major, H. F., 66.
 Malde, O. G., 91.
 Maney, T. J., 53.
 Mangan, W. J., 10.
 Mangels, C. E., 66.
 Mann, A., 16.
 Mann, A. R., 72.
 Mann, C. W., 17.
 Mann, J. M., 71.
 Manning, H., 91.
 Manns, T. F., 45.
 Manter, J. A., 45.
 Marbut, C. F., 23.
 Marden, J. W., 66.
 Maring, D. T., 6.
 Mark, C. G., 76.
 Markell, E. L., 17.
 Markey, W. E., 91.
 Markworth, H. W., 76.
 Marlatt, A. L., 91.
 Marlatt, C. L., 23, 24, 36, 93.
 Marr, J. C., 32.
 Marsden, R. D., 32.
 Marsh, C. D., 9.
 Marsh, H., 9.
 Marsh, H. O., 24.
 Marshall, B. J., 65.
 Marshall, C. E., 61.
 Marshall, C. G., 15.
 Marshall, F. R., 7.
 Marshall, G. D., 31, 84.
 Marshall, J. A., 86.
 Marshall, J. D., 44.
 Marshall, L. K., 43.
 Marsteller, R. P., 84.
 Martin, D. W., 74.
 Martin, E. A., 66.
 Martin, G. H., jr., 88.
 Martin, G. L., 67.
 Martin, G. W., 70.
 Martin, J. G., 32, 35.
 Martin, J. H., 15.
 Martin, J. N., 53.
 Martin, J. P., 13.
 Martin, L. H., 33.
 Martin, O. B., 29.
 Marvin, C. F., 5.
 Mason, A. C., 46.
 Mason, C. J., 45.
 Mason, P. W., 51.
 Mason, R. H., 8.
 Mason, S. C., 14.
 Massey, A. B., 39.
 Mastin, M. G., 19.
 Mather, S., 56.
 Matheson, K. J., 8.
 Matheson, R., 72.
 Mathews, C. W., 57.
 Mathews, H. B., 83.
 Mathews, O. R., 17.
 Mathewson, E. H., 15, 74.
 Mathis, F. K., 77.
 Matthews, C. D., 74.
 Matthews, C. H., 64.
 Matthews, W. C., 43.
 Matthews, W. S., 22.
 Mattoon, W. R., 12.
 Matz, J., 46.
 Maughan, H. J., 85.
 Maxon, E. T., 23.
 Maxson, R. N., 57.
 Maxwell, E. G., 68.
 May, D. W., 28, 81.
 Mayberry, M., 43.
 Mayhew, T. C., 43.
 Maynard, E. J., 71.
 Mayne, D. D., 64.
 Mays, M. L., 83.
 Meacham, F. T., 74.
 Meade, De V., 72.
 Meade, R. M., 15.
 Meade, V., 56.
 Meadows, W. R., 35, 36.
 Mebane, A. L., 75.
 Mearns, E. E., 82.
 Meek, E. B., 80.
 Meeker, F. N., 77.
 Meeks, J. R., 71.
 Mehaffey, E. E., 70.
 Meinecke, E. P., 14.
 Melander, A. L., 88.
 Melchers, L. E., 56.
 Melhus, I. E., 14.
 Meloy, G. S., 15.
 Meltzer, W. D., 62.
 Melvin, A. D., 7.
 Menagh, C. S., 25.
 Menardi, J. B., jr., 69.
 Menderson, N., 18.
 Menge, C. A., 8.
 Menig, O., 88.
 Menville, R. L., 58.
 Mercer, J. E., 26.
 Mercer, W. H., 75.
 Mercier, W. B., 29.
 Merkle, G. E., 82.
 Merrill, D. E., 71.
 Merrill, E. C., 19.
 Merrill, F. S., 56.
 Merrill, G. B., 81.
 Merrill, J. H., 56.
 Merrill, J. L., 16.
 Merrill, L. A., 85.
 Merrill, L. H., 59.
 Merrill, L. S., 59.
 Merrill, O. C., 10.
 Merrill, T. C., 19.
 Merritt, E., 27, 28.
 Merrow, H. L., 82.
 Mertz, W. M., 43.
 Mervine, E. M., 53.
 Merz, A. R., 23.
 Meserve, C. A., 21, 41.
 Meske, A. E., 70.
 Metcalf, C. L., 76.
 Metcalf, F. P., 72.
 Metcalf, H., 14.
 Metcalf, W., 43.
 Metcalf, Z. P., 74.
 Metzger, J. E., 60.
 Metzger, M. E., 41.
 Meunch, O. B., 66.
 Meyer, A. H., 23.
 Meyer, A. J., 66.
 Meyer, F. N., 18.
 Meyer, H. F., 34.
 Meyer, W. E., 8.
 Michaels, R. E., 53.
 Michel, C. W., 83.
 Mickle, J. D., 22.
 Middaugh, H. W., 72.
 Middaugh, T. R., 77.
 Middleton, W., 25.
 Milam, A. B., 79.
 Milbrath, D. G., 75.
 Miles, F. C., 16.
 Miles, G. F., 17.
 Miles, J. P., 91.
 Miles, L. E., 50.
 Miles, P. B., 23.
 Millar, C. E., 56.
 Millen, F. E., 62.
 Miller, A. McQ., 57.
 Miller, A. W., 8.
 Miller, C., 53.
 Miller, C. F. (N. C.), 74.
 Miller, C. F. (U. S. D. A.), 23.
 Miller, D. G., 32.
 Miller, E. C., 56.
 Miller, F. E., 17.
 Miller, G. E., 75.
 Miller, G. H., 4.
 Miller, G. J., 53.
 Miller, H. A., 4.
 Miller, H. M. A., 41.
 Miller, H. P., 77.
 Miller, J. H., 41.
 Miller, J. M., 25.
 Miller, Mrs. J. W., 40.
 Miller, M. F., 66.
 Miller, M. R., 43.
 Miller, O. C., 56.
 Miller, P. C., 71.
 Miller, P. E., 64.
 Miller, R. C., 15.
 Miller, R. F., 43.
 Miller, R. N., 88.
 Miller, R. W., 56.
 Miller, S. H., 65.
 Miller, S. P., 83.
 Miller, W., 50.
 Miller, W. P., 50.
 Millikin, C. S., 43.
 Millikin, F. B., 24.
 Mills, H. C., 51.
 Mills, T. B., jr., 36.
 Milner, R. D., 30.
 Milton, R. H., 15, 84.
 Millward, J. G., 91.
 Miner, J. R., 59.
 Minkler, F. C., 70, 71.
 Minns, L. A., 72.
 Misner, E. G., 72.
 Mitchell, A. J., 7.
 Mitchell, A. S., 18.

- Mitchell, C. W., 21.
 Mitchell, H. H., 50.
 Mitchell, J. D., 23.
 Mitchell, J. F., 43.
 Mitchell, J. H., 82.
 Mitchell, J. R., 62.
 Mitchell, R. P., 59.
 Mitchell, R. V., 70.
 Mitchell, S. C., 45.
 Mixa, F. E., 56.
 Mohler, J. R., 7, 93.
 Mohn, E., 77.
 Mollan, P. A., 51.
 Monahan, A. C., 93.
 Monahan, W. C., 59.
 Monahan, P. W., 59.
 Montague, E. J., 56.
 Montgomery, C. W., 77.
 Montgomery, E. G., 72.
 Montgomery, F., 4.
 Montgomery, J. A., 66.
 Montgomery, J. S., 64.
 Montgomery, L. M., 76.
 Montillon, E. D., 72.
 Moody, F. B., 72.
 Moody, H. W., 65.
 Mooers, C. A., 84.
 Moomaw, C. W., 33, 36.
 Moomaw, L., 16.
 Mooney, C. N., 23.
 Moore, B., 79.
 Moore, C., 79.
 Moore, J. G., 91.
 Moore, J. N., 43.
 Moore, J. S., 65.
 Moore, L. H., 40.
 Moore, M. D., 28.
 Moore, P., 48.
 Moore, R. A., 91.
 Moore, R. S., 26.
 Moore, T. T., 6.
 Moore, W., 64.
 Moorefield, C. H., 31.
 Moorhead, M. B., 64.
 Moorhouse, H. W., 78.
 Moorhouse, L. A., 4.
 Mooring, D. C., 78.
 Moran, C., 70.
 Moran, J. S., 35.
 Morbeck, G. C., 53.
 More, C. T., 33, 36.
 More, S. B., 53.
 Morehouse, A. D., 32.
 Moreland, C. C., 58.
 Moreland, R. W., 23.
 Morgan, A. C., 23.
 Morgan, A. M., 43.
 Morgan, D. G., 78.
 Morgan, D. N., 43.
 Morgan, E. L., 61.
 Morgan, F. P., 19.
 Morgan, G. W., 17.
 Morgan, H. A., 83.
 Morgan, H. J., 19.
 Morgan, J. D., 67.
 Morgan, J. F., 62.
 Morgan, J. O., 84.
 Morgan, L. E., 77.
 Morgan, W. J., 20.
 Morison, C. B., 45.
 Morr, E. C., 77.
 Morrell, F. W., 13.
 Morrey, C. B., 76.
 Morrill, A. W., 41.
 Morris, C. C., 31.
 Morris, C. K., 62.
 Morris, E. L. (Cal.), 43.
 Morris, E. L. (U. S. D. A.), 15.
 Morris, H., 58.
 Morris, H. E., 67.
 Morris, O. M., 88.
 Morrison, F. B., 91.
 Morrison, J. D., 15, 83.
 Morrison, T. M., 23.
 Morrow, H. E., 41.
 Morse, F. W., 61.
 Morse, G. B., 9.
 Morse, S. F., 41.
 Morse, W. J. (Me.), 59.
 Morse, W. J. (U. S. D. A.), 16.
 Morse, W. M., 59.
 Mortensen, M., 54.
 Mortimer, G. B., 91.
 Mortland, I., 58.
 Morton, A., 64.
 Morton, G. E., 44.
 Morton, O. A., 61.
 Moseley, R. S., 72.
 Moseley, T. W., 8.
 Mosher, F. H., 25.
 Mosher, W. E., 17.
 Mosier, J. G., 50.
 Moss, A. E., 45.
 Moss, E. G., 15, 74.
 Moss, M., 8.
 Mote, D. C., 77.
 Motl, D., 64.
 Moulton, C. R., 66.
 Moulton, L. H., 72.
 Mowry, H. H., 4.
 Mowry, J. L., 64.
 Mudd, A. I., 26.
 Muir, F., 48.
 Mulford, F. L., 17.
 Mulford, W., 43.
 Mullen, J. R., 74.
 Mulvania, M., 84.
 Mumford, E., 62.
 Mumford, F. B., 66, 93.
 Mumford, H. W., 50.
 Muncie, F. W., 50.
 Muncie, J. H., 62.
 Mundell, J. E., 17.
 Mundy, E. B., 66.
 Munger, H. B., 54.
 Munn, M. T., 73.
 Munro, W., 25.
 Munroe, E., 66.
 Munz, P. A., 72.
 Murdock, H. E., 67.
 Murphree, A. A., 46.
 Murphy, B. R., 65.
 Murphy, H. S., 54.
 Murphy, L. S., 11.
 Murphy, R. V., 56.
 Murray, A. G., 19.
 Murray, C., 54.
 Murray, F. E., 8.
 Murray, N. A., 89.
 Murray, N. C., 27.
 Musback, F. L., 91.
 Musselman, H. H., 62.
 Musser, K. B., 45.
 Mutchler, F., 57.
 Myer, D. S., 57.
 Myers, C. E., 80.
 Myers, C. H., 72.
 Myers, C. S., 83.
 Myers, P. R., 23.
 Myers, W. I., 72.
 Nabours, R. K., 56.
 Nahstoll, G. A., 34.
 Naquin, W. P., 48.
 Nash, E. H., 61.
 Nash, H. H., 59.
 Naylor, N. M., 54.
 Neal, J. W., 28, 40.
 Neal, R. T., 87.
 Neal, W. C., 35, 36.
 Neale, A. S., 56.
 Nealon, E. J., 20.
 Needham, J. G., 72.
 Needham, R. H., 56.
 Neil, L. R., 84.
 Neff, C. E., 66.
 Negley, N. A., 8.
 Nehrling, A. H., 61.
 Neiland, L. T., 46.
 Neilson, H. T., 56.
 Nellis, J. C., 12.
 Nelson, A., 92.
 Nelson, C. I., 75.
 Nelson, E. E., 66.
 Nelson, E. K., 19.
 Nelson, E. W., 26.
 Nelson, G. A., 88.
 Nelson, J., 70.
 Nelson, J. A., 25.
 Nelson, J. B., 67.
 Nelson, J. C., 8.
 Nelson, J. W. (Cal.), 43.
 Nelson, J. W. (U. S. D. A.), 11.
 Nelson, M., 41.
 Nelson, N. L. T., 46.
 Nelson, O. M., 79.
 Nelson, P., 29, 47.
 Nelson, S. B., 88.
 Nelson, V. E., 91.
 Nelson, W. P., jr., 84.
 Nelson, W. S., 65.
 Ness, H., 84.
 Netherton, T. M., 44.
 Neuls, J. D., 24.
 Neumann, I., 75.
 Nevens, W. B., 50.
 Nevius, W. J., 26.
 Newbill, T. J., 88.
 Newcomer, E. J., 24.
 Newell, C. R., 50.
 Newell, W., 84.
 Newlander, C. E., 62.

Newlin, C. I., 50.
 Newlin, J. A., 12.
 Newman, C. C., 82.
 Newman, C. L., 74.
 Newman, P. J., 56.
 Newsom, I. E., 44.
 Newton, H. D., 45.
 Newton, J. O., 75.
 Newton, R. L., 34.
 Nicholls, W. D., 57.
 Nichols, W. D., 32.
 Nickels, L. J., 43.
 Niederman, G., 50.
 Nighbert, E. M., 8.
 Niles, W. B., 8.
 Niswonger, H. R., 57.
 Niven, C. F., 82.
 Nixon, R. L., 34.
 Nixon, W. H., 43.
 Noer, O. J., 91.
 Nolan, A. W., 50.
 Noll, C. F., 80.
 Nollau, E. H., 57.
 Norcross, C. A., 69.
 Norcross, T. W., 10.
 Norgord, C. P., 91.
 Norris, R. S., 48.
 North, H. B., 70.
 Northrop, L. Z., 62.
 Norton, J. B., 14.
 Norton, J. B. S., 60.
 Norton, W. C., 74.
 Norwood, F. J., 65.
 Noteware, I. R., 62.
 Nougaret, R. L., 24.
 Noyes, A. A., 72.
 Noyes, G. H., 7.
 Noyes, H. A., 51.
 Nuckols, S. B., 17.
 Nunn, R., 7.
 Nutter, J. W., 57.
 Nye, C., 72.
 Nye, H. L., 68.
 Nystrom, A. B., 88.

Oakleaf, H. B., 13.
 Oakley, R. A., 16, 17.
 Oates, M. B., 4.
 Oberlin, M. L., 44.
 Obold, L. J., 80.
 O'Brien, W. J., 23.
 Obst, M. M., 20.
 Odell, F. L., 8.
 O'Donnell, R. F., 54.
 Officer, C. C., 54.
 Ogaard, A. J., 17, 75.
 Ogden, E. L., 27.
 Ogle, G. L., 51.
 Oglesby, W. F., 43.
 Ohlsen, E. V., 69.
 O'Kane, W. C., 70.
 Okey, C. W., 32.
 Okey, M., 76.
 O'Leary, E. B., 23.
 O'Leary, W. J., 30.
 Oley, W. W., 70.
 Oliver, A. G., 74.

Oliver, G. L., 8, 89.
 Oliver, G. W., 18.
 Oliver, M. B., 89.
 Olmstead, L. B., 23.
 Olsen, A. M., 69.
 Olsen, J. C., 84.
 Olson, G. A., 88.
 Olson, O., 15.
 Olson, P. J., 64.
 O'Neal, A. T., 58.
 O'Neill, C. J., 54.
 Onsrud, E. A., 8.
 Oosterhuis, A. C., 91.
 Opperman, C. L., 60.
 Orcutt, A. S., 77.
 Orton, C. R., 80.
 Orton, W. A., 14, 36.
 Osborn, G. A., 70.
 Osborn, H., 76.
 Osborn, H. T., 48.
 Osborn, L. W., 41.
 Osborn, M. G., 58.
 Osborn, W. M., 17.
 Osborne, T. B., 45.
 Oskamp, J., 51.
 Osler, H. S., 59.
 Osmun, A. V., 61.
 Ostrander, J. E., 61.
 Ostrander, W. A., 83.
 Oswald, W. L., 64.
 Otis, D. H., 91.
 O'Toole, S., 75.
 Ousley, C., 84.
 Overholser, E. L., 72.
 Overly, F. L., 54.
 Overton, W. R., 32.
 Owen, E. J., 70.
 Owen, T. M., 8.
 Owen, W. L., 58.

Pace, E. S., 46.
 Packard, C. M., 23.
 Packard, W. E., 43.
 Paddock, F. B., 84.
 Paddock, W., 76.
 Page, F. S., 86.
 Page, I. E., 78.
 Page, L. W., 30.
 Page, W. B., 23.
 Paige, E. O., 46.
 Paige, J. B., 61.
 Pailthorp, R. R., 45.
 Paine, H. C., 51.
 Paine, H. S., 19.
 Paine, J. H., 24.
 Painter, R., 78.
 Palen, A. E., 31.
 Palkin, S., 19.
 Palmer, C. C., 64.
 Palmer, G., 56.
 Palmer, H. E., 20.
 Palmer, L. S., 66.
 Palmer, M. A., 44.
 Palmer, T. S., 26.
 Palmer, W. C., 75.
 Palmer, W. H., 76.
 Palmer, W. R., 51.
 Palmore, J. I., 19.

Pammel, L. H., 54.
 Parent, A. J., 58.
 Park, J. W., 33.
 Parker, C. E., 19.
 Parker, E. G., 23.
 Parker, F. L., 45.
 Parker, H. B., 35, 36.
 Parker, H. L., 23.
 Parker, J. H., 15.
 Parker, J. R., 67.
 Parker, W. B., 43.
 Parks, G. H., 9.
 Parks, K. E., 8.
 Parks, P. C., 40.
 Parman, D. C., 25.
 Parmelee, A. E., 84.
 Parrish, C., 85.
 Parrish, E. M., 40.
 Parrish, G. R., 87.
 Parrott, P. J., 73.
 Parry, H. S., 31.
 Parshall, R. L., 44.
 Parsons, H. T., 91.
 Parsons, M., 50.
 Parsons, T. S., 92.
 Patch, E. M., 59.
 Patch, R. H., 72.
 Pate, R. H., 65.
 Pate, W. F., 74.
 Paterson, A. G., 88.
 Paterson, A. M., 56.
 Paterson, T. G., 64.
 Patrick, A. L., 23.
 Patrick, G. E., 19.
 Patten, A. J., 62.
 Patten, C. G., 17.
 Patten, H. E., 18.
 Patterson, F. W., 13.
 Patterson, H. J., 60.
 Patterson, S. W., 59.
 Pattison, E. M., 16.
 Patton, C. A., 77.
 Patton, L., 21.
 Patton, O. V., 88.
 Pauls, J. T., 31.
 Paxman, J. W., 85.
 Payne, L. F., 61.
 Peacock, W. M., 72.
 Peairs, L. M., 89.
 Pearce, J. R., 16.
 Pearce, W. T., 82.
 Pearl, R., 36, 59, 93.
 Pearson, F. A., 50.
 Pearson, R. A., 52, 93.
 Peck, A. L., 79.
 Peck, A. S., 10.
 Peck, C. K., 56.
 Peck, F. W., 64.
 Peer, H., 79.
 Pegg, E. C., 66.
 Peirson, L., 47.
 Peitersen, A. K., 86.
 Pellet, F. C., 54.
 Peltier, G. L., 50.
 Pelton, W. C., 45.
 Pember, F. R., 82.
 Pemberton, C. E., 24.
 Pence, M. L., 57.

- Pence, M. O., 45.
 Pendleton, R. L., 43.
 Pennington, M. E., 21.
 Pennington, W. E., 23.
 Pennock, O., 44.
 Penny, C. L., 45.
 Pennybacker, J. E., 30.
 Peppard, L. L., 62.
 Pergande, T., 25.
 Perlisho, E. C., 83.
 Perkins, A. E., 77.
 Perkins, G. A., 19.
 Perkins, H. F., 86.
 Perkins, R. C. L., 48.
 Perkins, S. O., 74.
 Perley, G. A., 70.
 Perry, C. R., 82.
 Person, F. G., 44.
 Peter, A. M., 57.
 Peters, C. A., 61.
 Peters, J. G., 11.
 Peters, W. H., 75.
 Peterson, C. E., 17.
 Peterson, C. H., 67.
 Peterson, E. G., 85.
 Peterson, H., 69.
 Peterson, P. P., 48.
 Peterson, R. M., 33.
 Peterson, T. C., 31.
 Peterson, W., 86.
 Peterson, W. A., 17.
 Peterson, W. H., 91.
 Petry, E. J., 51.
 Pettee, C. H., 70.
 Pettit, M. J., 54.
 Pettit, R. H., 62.
 Pettit, S., 41.
 Pevy, W. P., 65.
 Pew, I. W., 9.
 Pew, W. H., 54.
 Pfaender, M., 17.
 Pfanstiel, R., 57.
 Pflueger, O. W., 76.
 Pfund, A., 91.
 Phelps, I. K., 20.
 Phillips, A. G., 51.
 Phillips, E. F., 25.
 Phillips, H. D., 72.
 Phillips, J. V., 32.
 Phillips, T. D., 76.
 Phillips, T. G., 76.
 Phillips, W. J., 23.
 Pickel, F. W., 41.
 Pickel, J. M., 74.
 Pickens, J. M., 10.
 Pickerill, H. M., 73.
 Pickett, B. S., 50.
 Pickett, F. L., 88.
 Piemeisel, F. J., 15.
 Piemeisel, R. L., 16.
 Pier, H. B., 69.
 Pierce, H. C., 21.
 Pierce, L., 14.
 Pierce, R. G., 14.
 Pierce, V. M., 31.
 Pierce, W. D., 23.
 Pierpont, J. H., 70.
 Pierson, A. H., 12.
 Pieters, A. J., 16.
 Pilkington, B., 79.
 Pillsbury, J. J., 25.
 Pillsbury, J. P., 74.
 Pinckney, R. M., 68.
 Pinkerton, H. E., 8.
 Pinnell, W. R., 57.
 Pipal, F. J., 51.
 Piper, C. V., 16.
 Piper, H. A., 21.
 Pistor, A. J., 9.
 Pittier, H., 15.
 Plagge, H. J., 54.
 Plank, H. K., 24.
 Pletcher, L., 54.
 Plum, H. M., 69.
 Plumb, C. S., 76.
 Plummer, J. K., 74.
 Poats, T. G., 82.
 Poe, H. T., jr., 34.
 Pohland-Schilling, O., 79.
 Pomeroy, C. S., 17.
 Pomeroy, J. C., 54.
 Pompey, R. S., 40.
 Pontius, R. L., 57.
 Pool, V. W., 14.
 Poole, J. P., 56.
 Pooler, F. C. W., 13.
 Pope, G. W., 9.
 Pope, M. N., 75.
 Pope, W. B., 20.
 Popenoe, C. H., 24.
 Popenoe, F. W., 18.
 Popenoe, H. L., 56.
 Porter, C. S., 57.
 Porter, C. W. (Iowa), 54.
 Porter, C. W. (Utah), 86.
 Porter, J. T., 84.
 Porter, W. R., 75.
 Postle, S. A., 18.
 Potter, A. A., 15.
 Potter, A. F., 10, 11.
 Potter, E. L., 79.
 Potter, G. F., 91.
 Potter, G. M., 9.
 Potter, O., 64.
 Potter, R. S., 54.
 Potter, S. M., 46.
 Potter, W. R. R., 48.
 Potts, A. E., 54.
 Potts, A. R., 62.
 Potts, A. T., 84.
 Potts, R. C., 34.
 Powell, A. R., 69.
 Powell, B. E., 50.
 Powell, O., 29.
 Powell, O. N., 31.
 Powell, P. P., 39.
 Powell, T. F., 33.
 Powers, W. H., 83.
 Powers, W. L., 79.
 Prats, E. R., 81.
 Pratt, C. D., 87.
 Pratt, F. R., 70.
 Pratt, H. E., 40.
 Pratt, M. B., 43.
 Pratt, O. A., 14.
 Prentice, B. N., 51.
 Preston, H. A., 25.
 Preston, J. F., 13.
 Price, D. J., 19.
 Price, H. L., 86.
 Price, J. C. C., 39.
 Price, J. D., 21.
 Price, J. M., 46.
 Price, J. N., 88.
 Price, R. B., 66.
 Price, W. A., 51.
 Pride, W. F., 59.
 Pridmore, J. C., 84.
 Prien, O. L., 92.
 Prillerman, B., 89.
 Primm, R. L., 91.
 Prince, F. S., 70.
 Pritchard, F. D., 31.
 Pritchard, F. J., 14.
 Pritchett, L. F., 39.
 Pritchett, V. C., 74.
 Proctor, L. G., 47.
 Proctor, W. F., 84.
 Prosser, C. S., 76.
 Proulx, E. G., 52.
 Prucha, M. J., 50.
 Prusia, J., 83.
 Publow, H. L., 62.
 Puckett, F. S., 74.
 Pugsley, C. W., 68, 93.
 Purcell, B. L., 22.
 Purssell, U. G., 7.
 Puryear, C., 84.
 Putnam, J. J., 48.
 Putney, F. S., 80.
 Pyles, O. D., 40.
 Quaife, E. L., 61.
 Quaintance, A. L., 24, 36.
 Quayle, H. J., 43.
 Quereau, F. C., 58.
 Quick, W. C., 17.
 Quiggle, E. B., 4.
 Quinn, E. J., 68.
 Quintero, J., 71.
 Quinton, R. M., 40.
 Rabak, F., 15.
 Rabild, H., 8.
 Raburn, G. E., 56.
 Rachford, C. E., 13.
 Rader, F. W., 88.
 Rae, R. M., 54.
 Ragan, S. A., 15.
 Ralston, G. S., 87.
 Ramsay, R. A., 8.
 Ramser, C. E., 32.
 Ramsey, G. B., 59.
 Ramsey, H. J., 17.
 Ramsower, H. C., 76.
 Ranck, E. M., 65.
 Rand, F. V., 13.
 Rand, J. B., 66.
 Randall, L. N., 59.
 Randell, R. R., 10.
 Randlett, G. W., 75.
 Randolph, R. B. F., 22.
 Rane, F. W., 61.
 Rankin, F. H., 50.
 Rankin, J. M., 18.
 Rankin, J. O., 66.

- Rankin, W. H., 73.
 Ransom, B. H., 9.
 Ransom, J. H., 52.
 Raridon, D., 54.
 Rasmussen, F., 70.
 Rast, F. M., jr., 46.
 Rast, L. E., 47.
 Ratcliff, J. A., 69.
 Raven, P. E., 62.
 Raven, W. F., 62.
 Rawl, B. H., 8.
 Ray, H. C., 78.
 Rayner, O. S., 44.
 Read, E. A., 20.
 Reade, J. M., 47.
 Reavis, G. W., 66.
 Recknagel, A. B., 73.
 Records, E., 69.
 Reddick, D., 73.
 Redenbaugh, H. E., 78.
 Redhead, J. A., 58.
 Redman, R. W., 59.
 Reed, A. J., 8, 74.
 Reed, C. A., 17.
 Reed, C. O., 50.
 Reed, E. L., 84.
 Reed, E. O., 20.
 Reed, E. P., 73.
 Reed, F. H., 62.
 Reed, F. W., 13.
 Reed, G. M., 66.
 Reed, H. R., 16.
 Reed, H. S., 43.
 Reed, J. B., 20.
 Reed, N. E., 56.
 Reed, O. E., 56.
 Reed, R. C., 45.
 Reed, T. C., 66.
 Reed, W. G., 4.
 Reed, W. H., 92.
 Reeder, G., 76.
 Rees, C. C., 50.
 Rees, H. L., 88.
 Rees, R. W., 61.
 Reese, A. M., 89.
 Reese, H. H., 7.
 Reese, M. J., 39.
 Reese, R. M., 3.
 Reeve, C. S., 31.
 Reeves, G. I., 23.
 Regan, W. M., 66.
 Regan, W. S., 61.
 Regensburger, M., 21.
 Regt, A. C. de, 70.
 Reid, C. B., 75.
 Reid, F. R., 14.
 Reimer, F. C., 79.
 Reiner, F., 70.
 Reisner, E. H., 56.
 Remington, R. E., 75.
 Remsburg, C. G., 60.
 Renshaw, R. R., 54.
 Rettger, L. F., 45.
 Reynolds, B. A., 25.
 Reynolds, E. S., 75.
 Reynolds, M. H., 64.
 Reynolds, R. E., 79.
 Reynolds, R. V. R., 11.
 Rhodes, W. H., jr., 31.
 Rhue, S. N., 77.
 Rice, C. D., 54.
 Rice, F. E., 73.
 Rice, J. E., 73.
 Rice, M. L., 36.
 Rice, T. D., 23.
 Rich, F. A., 86.
 Richards, B. L., 86.
 Richards, G., 91.
 Richards, M. W., 52.
 Richardson, A. G. G., 76.
 Richardson, A. M., 88.
 Richardson, C. H., 70.
 Richardson, E. S., 58.
 Richardson, H. B., 16, 35.
 Richardson, J., 76.
 Richey, F. D., 15.
 Richey, H. W., 54.
 Richmond, E. A., 73.
 Richmond, T. E., 77.
 Rick, N. D., 40.
 Ricker, P. L., 16.
 Rickey, H. W., 57.
 Ricks, J. R., 65.
 Riddell, F. T., 62.
 Rideout, P. A., 31.
 Ridgell, R. H., 84.
 Ridgway, C. S., 15.
 Ridgway, J. W., 84.
 Ridley, V. W., 17.
 Rietz, H. L., 50.
 Rieves, C. B., 75.
 Riggs, W. M., 82, 93.
 Rigney, I. E., 56.
 Riley, B. M., 54.
 Riley, E. H., 68.
 Riley, H. W., 73.
 Riley, S., 13.
 Riley, W. A., 73.
 Rinehart, E. F., 18.
 Ringland, A. C., 13.
 Rinkle, L. G., 66.
 Ripley, G. E., 41.
 Rittenberg, S. S., 82.
 Rittue, E. C., 17.
 Ritzman, E. G., 70.
 Rixford, G. P., 14.
 Roadhouse, C. L., 43.
 Roark, L., 65.
 Roark, R. C., 20.
 Robb, B. B., 73.
 Robb, N. S., 48.
 Robbins, F. E., 52.
 Robbins, H. E., 61.
 Robbins, L. W., 79.
 Robbins, W. J., 73.
 Robbins, W. S., 62.
 Robbins, W. W., 44.
 Robert, J. C., 65.
 Robert, S. A., 84.
 Roberts, E., 50.
 Roberts, E. N., 92.
 Roberts, G., 57.
 Roberts, G. A., 74.
 Roberts, H. F., 56.
 Roberts, I. P., 73.
 Roberts, J. W., 14.
 Roberts, O. S., 52.
 Roberts, O. W., 7.
 Roberts, R. H., 91.
 Roberts, R. W., 5.
 Robertson, A. G., 40.
 Robertson, A. K., 74.
 Robertson, L. S., 52.
 Robertson, R. D., 32.
 Robeson, F. L., 87.
 Robey, O. E., 62.
 Robilliard, H., 54.
 Robinson, A. L., 79.
 Robinson, C. M., 50.
 Robinson, C. S., 62.
 Robinson, F. C., 46.
 Robinson, M., 73.
 Robinson, R. H., 79.
 Robinson, S. M., 75.
 Robinson, W. O., 23.
 Rockie, W. A., 23.
 Rockwell, J. E., 13.
 Rockwell, W. L., 32.
 Rockwood, L. P., 23.
 Roderick, L. M., 47.
 Rodes, W., jr., 57.
 Roe, H. B., 64.
 Rogers, D. M., 25.
 Rogers, J. S., 20.
 Rogers, L. A., 8.
 Rogers, R. F., 23.
 Rogers, S. S., 43.
 Rogers, W. H., 59.
 Rohwer, C. H., 44.
 Rohwer, S. A., 25.
 Rokahr, M., 69.
 Rolfs, F. M., 82.
 Rolfs, P. H., 46, 93.
 Rommel, G. M., 7.
 Rood, H. P., 71.
 Roop, J. H., 52.
 Root, C. J., 7.
 Root, R. R., 50.
 Rose, D. H., 67.
 Rose, F., 73.
 Rose, R. C., 60.
 Rosenbaum, J., 73.
 Rosenboom, B. B., jr., 62.
 Rosengarten, W. E., 31.
 Rosenkrans, D. B., 82.
 Rosewell, O. W., 58.
 Ross, B. B., 39.
 Ross, D. E., 71.
 Ross, H. E., 73.
 Ross, J. F., 15.
 Ross, P. H., 56.
 Ross, S. E., 69.
 Ross, S. H., 18.
 Ross, W. H., 23.
 Rost, C. O., 61.
 Rothgeb, B. E., 15.
 Rothrock, P., 15.
 Round, L. A., 20.
 Rouse, T. A., 82.
 Rowan, L. J., 65.
 Rowe, B., 64.

- Rowell, J. L., 86.
 Royall, R. E., 31.
 Rubinow, S. G., 85.
 Rucker, E. H., 66.
 Rudd, W. N., 84.
 Rudnick, A. W., 54.
 Ruehe, H. A., 50.
 Ruehle, G. L. A., 74.
 Ruffner, R. H., 60.
 Ruggles, A. G., 64.
 Rumsey, L. A., 54.
 Rumsey, W. F., 89.
 Runner, G. A., 23.
 Rupp, P., 8.
 Ruprecht, R. W., 61.
 Rusk, H. M., 69.
 Rusk, H. P., 50.
 Russell, A. R., 74.
 Russell, C. A., 15.
 Russell, F. L., 59.
 Russell, G. A., 15.
 Russell, G. E., 54.
 Russell, G. P., 58.
 Russell, H. L., 22, 90, 93.
 Russell, S. M., 40.
 Rust, E. W., 24.
 Ruth, W. A., 50.
 Rutland, J. R., 39.
 Rutledge, R. H., 13.
 Ruzek, C. V., 79.
 Ruzicka, C. H., 17, 75.
 Ruzicka, L. A., 71.
 Ryan, J. C., 65.
- Sachs, W. H., 50.
 Sackett, W. G., 44.
 Safford, W. E., 16.
 Sahr, C. A., 28, 48.
 St. John, B. H., 19.
 Salant, W., 21.
 Sale, J. W., 21.
 Salisbury, G. N., 7.
 Salisbury, S. M., 74.
 Salmon, C., 56.
 Salter, F. J., 77.
 Sammet, C. F., 20.
 Sammis, J. L., 91.
 Samson, G. R., 79.
 Sanborn, C. E., 78.
 Sanders, J. G., 91.
 Sanderson, T., 75.
 Sandhouse, H. A., 41.
 Sandsten, E. P., 44.
 Sanford, F. H., 62.
 Sanford, H. L., 24.
 Sargent, C. G., 44.
 Sarvis, J. T., 17.
 Sasscer, E. R., 24.
 Satterthwait, A. F., 23, 52.
 Saunders, A., 86.
 Saunders, D. A., 15.
 Saunders, W. D., 87.
 Saunders, W. W., 89.
 Savage, E. M., 14.
 Savage, E. S., 73.
 Savage, G. O., 18.
 Savely, H. E., 29.
- Sawyer, E. E., 59.
 Sawyer, H. A., 69.
 Sayre, C. B., 52.
 Scales, E. L., 54.
 Scales, F. M., 14.
 Scales, G. C., 31.
 Scammell, H. B., 24.
 Schaeffer, A. A., 84.
 Schafer, E. G., 88.
 Schaffner, J. B., jr., 25.
 Schaffner, J. H., 77.
 Schalk, A. F., 75.
 Scheppelman, W., 57.
 Scherer, N. E., 77.
 Scherffius, C. H., 89.
 Schermerhorn, G., 54.
 Schermerhorn, L. G., 70.
 Schern, K., 54.
 Scherrer, J. B., 70.
 Schieferstein, W., 71.
 Schilling, O. P., 79.
 Schindler, L. M., 91.
 Schleussner, O. W., 33.
 Schlundt, H., 67.
 Schmidt, H., 85.
 Schmidt, R., 71.
 Schmit, C., 91.
 Schmitz, N., 60.
 Schnabel, J., 46.
 Schneck, H. W., 73.
 Schneider, C. F., 7.
 Schneider, F. L., 8.
 Schneider, P., 86.
 Schneller, M. A., 58.
 Schoene, W. J., 86.
 Schoening, H. W., 9.
 Schoenleber, F. S., 56.
 Schoenmann, L. R., 23.
 Schollenberger, C. J., 77.
 Schoonover, W. R., 50.
 Schoppe, W. F., 68.
 Schoultz, F. H., 54.
 Schrack, C. V., 48.
 Schreiner, O., 14.
 Schroeder, E. C., 10.
 Schroeder, J. P., 23.
 Schulte, J. I., 28.
 Schultze, G. L., 4.
 Schulze, A. F., 20, 45.
 Schulze, E., 35.
 Schurman, J. G., 71.
 Schuyler, J. F., 31.
 Schwab, J. W., 52.
 Schwartz, B., 20.
 Schwartz, L. H., 52.
 Schwarz, E. A., 25.
 Schweickard, P., 64.
 Schweis, G. G., 69.
 Scoates, D., 65.
 Scobey, F. C., 32.
 Scofield, C. S., 17.
 Scott, C. A., 56.
 Scott, C. H., 62.
 Scott, C. L., 23.
 Scott, E. M., 77.
 Scott, E. W., 24.
 Scott, J. M., 46.
 Scott, J. S., 48.
- Scott, J. W., 92.
 Scott, L., 17.
 Scott, M., 74.
 Scott, V. E., 8, 69.
 Scovill, L. M., 91.
 Scoville, R. I., 73.
 Scribner, F., 91.
 Scribner, F. L., 5.
 Scudder, H. D., 79.
 Scullen, H. A., 54.
 Seal, J. L., 54.
 Seamans, A. E., 17.
 Searles, N. P., 43.
 Searles, S., 26.
 Sears, F. C., 61.
 Seaton, L. F., 69.
 Secrest, E., 77.
 Seeds, K. B., 34.
 Seeley, D. A., 62.
 Selby, A. D., 77.
 Selector, I., 58.
 Sellers, O. H., 39.
 Selvig, C. G., 64.
 Setchell, W. A., 43.
 Seth, J. O., 4.
 Seulke, K. J., 73.
 Severance, G., 88. •
 Severin, H. C., 83.
 Severson, B. O., 80.
 Severy, H. A., 73.
 Sewall, H. W., 64.
 Sewall, Mrs. T. R., 64.
 Sewell, M. C., 56.
 Seyboth, R., 6.
 Seymour, L., 50.
 Seymour, R. J., 77.
 Shafer, F. F., 32.
 Shafer, G. D., 62.
 Shamel, A. D., 17.
 Shanklin, F. M., 52.
 Shanley, C., 83.
 Shantz, H. L., 16.
 Shaper, B. W., 73.
 Shapovalov, M., 59.
 Sharp, D., jr., 86.
 Sharp, L. T., 43.
 Sharp, L. W., 73.
 Sharples, N., 77.
 Shattuck, C. H., 48.
 Shattuck, O., 79.
 Shaw, C. F., 43.
 Shaw, E. L., 7.
 Shaw, G. H., 9.
 Shaw, H. J., 59.
 Shaw, J. K., 61.
 Shaw, R. H., 8.
 Shaw, R. S., 61.
 Shaw, S. B., 60.
 Shaw, W. T., 88.
 Shea, H. M., 83.
 Shear, C. L., 14.
 Shear, W. V., 17.
 Shearer, P. S., 54.
 Shearman, T. G., 5.
 Shedd, C. K., 54.
 Shedd, O. M., 58.
 Sheets, E. W., 89.
 Sheets, O., 56.

- Sheldon, J. L., 89.
 Shellabear, H. P., 88.
 Shelley, P. N., 86.
 Shepard, C. E., 45.
 Shepard, J. H., 83.
 Shepperd, A., 75.
 Shepperd, J. H., 75.
 Shepperd, J. L., 64.
 Sherbakoff, C. D., 46.
 Sherman, A. L., 88.
 Sherman, C. B., 32.
 Sherman, E. A., 11.
 Sherman, F., jr., 74.
 Sherman, J. H., 33.
 Sherman, J. M., 80.
 Sherman, W. A., 33, 36.
 Sherwin, M. E., 74.
 Sherwood, C. M., 21.
 Sherwood, F. B., 74.
 Sherwood, N. C., 59.
 Sherwood, R. M., 56.
 Sherwood, S. F., 19.
 Shibley, J. G., 36.
 Shields, R. L., 82.
 Shinn, C. H., 12.
 Shinn, J. R., 88.
 Shinn, W. R., 79.
 Shippen, L. P., 20.
 Shoemaker, D. N., 17.
 Shoemaker, J. N., 77.
 Shoesmith, V. M., 62.
 Shollenberger, J. H., 15.
 Shore, H. J., 8.
 Shorey, E. C., 14.
 Short, A. K., 85.
 Shrader, H. L., 21.
 Shuler, W. P., 78.
 Shull, J. M., 14.
 Siegel, M., 71.
 Siegler, E. H., 24.
 Sievers, A. F., 15.
 Silberberger, B. H., 20.
 Silcox, F. A., 13.
 Silva, R. C., 81.
 Silvester, R. W., 60.
 Simanton, F. L., 24.
 Simmonds, E., 18.
 Simmons, G. E., 59.
 Simmons, W. H., 58.
 Simms, B. T., 79.
 Simonsen, W. E., 54.
 Simpson, F. M., 34.
 Simpson, H. L., 82.
 Simpson, O. G., 79.
 Simpson, S. T., 67.
 Sinclair, W., 59.
 Singleton, F. E., 27.
 Sirrine, E. F., 16.
 Sirrine, F. A., 74.
 Sisson, S., 77.
 Sive, B. E., 67.
 Skeeler, F. J., 85.
 Skeels, H. C., 18.
 Skelly, W. R., 52.
 Skelton, G. V., 79.
 Skinner, A. E., 56.
 Skinner, J. H., 51.
 Skinner, J. J., 14.
 Skinner, L., 77.
 Skinner, L. T., 69.
 Skinner, W. W., 21.
 Skoffeld, P. F., 87.
 Slade, D. D., 58.
 Slade, H. C., 35.
 Slate, W. L., jr., 45.
 Slaughter, J. P., 7.
 Sleight, R. B., 32.
 Slipper, J. A., 52.
 Sloan, S. L., 83.
 Sloan, W. G., 32.
 Smalley, H. R., 4.
 Smies, E. H., 23.
 Smith, A. (Cal.), 43.
 Smith, A. (Mont.), 68.
 Smith, A. B., 56.
 Smith, A. C., 64.
 Smith, A. G. (Ky.), 58.
 Smith, A. G. (U. S. D. A.), 4.
 Smith, A. W., 10.
 Smith, C. B., 29.
 Smith, C. G., 13.
 Smith, C. M., 20.
 Smith, C. O., 43.
 Smith, C. P., 60.
 Smith, C. S., 13.
 Smith, C. W., 69.
 Smith, E. B., 32.
 Smith, E. C., 86.
 Smith, E. E., 18.
 Smith, E. F., 13.
 Smith, E. H., 43.
 Smith, F. A. C., 50.
 Smith, F. H. (Ga.), 47.
 Smith, F. H. (R. I.), 82.
 Smith, G. A., 74.
 Smith, G. D., 23.
 Smith, G. E., 68.
 Smith, G. E. P., 41.
 Smith, H. A., 10.
 Smith, H. C., 23.
 Smith, H. E., 23.
 Smith, H. G., 17.
 Smith, H. J., 65.
 Smith, H. W., 59.
 Smith, J., 91.
 Smith, J. E., 60.
 Smith, J. G. (Hawaii), 47.
 Smith, J. G. (U. S. D. A.), 23.
 Smith, J. L., 79.
 Smith, J. V., 85.
 Smith, John W., 7.
 Smith, J. Warren, 7, 77.
 Smith, L. A., 86.
 Smith, L. B., 87.
 Smith, L. H., 50.
 Smith, M., 21.
 Smith, M. J., 58.
 Smith, N. R., 14.
 Smith, O. C., 78.
 Smith, P. H., 22, 61.
 Smith, R., 86.
 Smith, R. E. (Cal.), 43.
 Smith, R. E. (Iowa), 54.
 Smith, R. G., 61.
 Smith, R. I., 81.
 Smith, R. M., 79.
 Smith, R. O., 70.
 Smith, R. S. (Pa.), 80.
 Smith, R. S. (U. S. D. A.), 8.
 Smith, R. W., 15.
 Smith, T. O., 70.
 Smith, V., 78.
 Smith, V. C., 77.
 Smith, W., 60.
 Smith, W. B., 75.
 Smith, W. G., 23.
 Smith, W. H., 50.
 Smith, W. V., 58.
 Smith, W. W., 52.
 Smith, Z. M., 52.
 Smulyan, M. T., 87.
 Smyth, E. A., jr., 87.
 Smyth, E. G., 81.
 Smyth, P. H., 7.
 Smyth, S. P., 52.
 Snapp, R. R., 89.
 Snell, F., 56.
 Snider, H. J., 50.
 Snodgrass, A. C., 65.
 Snodgrass, M. D., 28, 40.
 Snook, J. H., 77.
 Snow, C. M., 87.
 Snow, O. L., 62.
 Snow, S. J., 23.
 Snyder, D. E., 77.
 Snyder, E., 17.
 Snyder, J. L., 61.
 Snyder, J. M., 23.
 Snyder, R. S., 54.
 Snyder, T. E., 25.
 Snyder, W. P., 69.
 Solem, O. P., 31.
 Somes, M. P., 67.
 Sondergaard, M. P. A., 8.
 Sorensen, C. J., 86.
 Soule, A. M., 46.
 Southwick, B. G., 45.
 Spady, S. D., 87.
 Spalding, E., 67.
 Spangler, S. M., 84.
 Sparks, E. E., 80.
 Spaulding, M. H., 68.
 Spaulding, P., 14.
 Speare, A. T., 48.
 Spears, H. D., 58.
 Speh, C. F., 20.
 Spence, E. R., 67.
 Spence, T. H., 60.
 Spencer, A. P., 46.
 Spencer, D. A., 78.
 Spencer, G. C., 19.
 Spillman, W. J., 4.
 Spinney, L. B., 54.
 Spitzer, G., 52.
 Spoon, W. L., 31.
 Spragg, F. A., 62.
 Sprague, C. B., 88.
 Sprague, H. B., 67.
 Sprague, M. E., 45.
 Spring, S. N., 73.
 Spurway, C. H., 62.
 Squire, C. H., 11.
 Stabler, H. O., 13.

- Stadtmueller, F. H., 21.
 Staebner, F. E., 32.
 Stahl, C. F., 25.
 Stahl, C. J., 13.
 Stahl, H. S., 87.
 Stahl, J. L., 88.
 Stakman, E. C., 64.
 Staley, W. F., 4.
 Stallings, B. D., 26.
 Stange, C. H., 54.
 Stanley, C. W., 52.
 Stanley, F. W., 32.
 Stanley, H. H., 70.
 Stanley, L., 67.
 Stanton, A. C., 67.
 Stanton, E. W., 54.
 Stanton, M. B., 50.
 Stanton, T. R., 15.
 Staples, C. H., 58.
 Starcher, G. C., 87.
 Starin, W. A., 77.
 Starks, D. A., 46.
 Starr, C. G., 52.
 Starr, S. H., 47.
 Starring, C. A., 68.
 Starring, G. A., 83.
 Steddom, R. P., 8.
 Stedman, J. M., 28.
 Steece, H. M., 15.
 Steele, H. C., 65.
 Steen, F. D., 54.
 Steenbock, H., 91.
 Steik, K. T., 92.
 Steinberg, A. J., 16.
 Steinkoenig, L. A., 23.
 Stelzenmuller, G. V., 39.
 Stemmons, W., 78.
 Stemple, F. W., 77.
 Stene, A. E., 81.
 Stenius, J. A., 77.
 Stephens, D. E., 15, 79.
 Stephens, J. M., 17.
 Stephens, L., 54.
 Stephens, M., 87.
 Stephenson, C. H., 20.
 Sterrett, W. D., 12.
 Steve, N. D., 73.
 Stevens, A. T., 45.
 Stevens, E. H., 23.
 Stevens, F. D., 4.
 Stevens, G. E., 50.
 Stevens, H. E., 46.
 Stevens, J. S., 59.
 Stevens, N. E., 14.
 Stevens, O. A., 75.
 Stevens, R. T., 43.
 Stevenson, A. E., 19.
 Stevenson, J. A., 81.
 Stevenson, J. N., 59.
 Stevenson, W. H., 54.
 Stewart, E. D., 75.
 Stewart, F. C., 74.
 Stewart, G., 86.
 Stewart, G. R., 43.
 Stewart, H. W., 91.
 Stewart, J. P., 80.
 Stewart, J. T., 32, 64.
 Stewart, L. M., 91.
 Stewart, M. M., 33.
 Stewart, O. J., 70.
 Stewart, R., 50.
 Stewart, R. H., 86.
 Stewart, V. B., 73.
 Stiles, C. F., 58.
 Stimmel, S. E., 77.
 Stivers, E. D., 83.
 Stockberger, W. W., 15.
 Stockham, W. L., 75.
 Stocking, W. A., jr., 73.
 Stockman, W. B., 7.
 Stockwell, C. W., 25.
 Stockwell, E. R., 79.
 Stockwell, H. C., 8.
 Stoddard, E. F., 60.
 Stoddard, E. M., 45.
 Stoddard, C. W., 80.
 Stokes, C. E., 58.
 Stoltenberg, F. C., 83.
 Stoltz, R. B., 77.
 Stone, A. L., 91.
 Stone, C. W., 70.
 Stone, G. E., 61.
 Stone, J. L., 73.
 Stone, T. C., 77.
 Stone, W. C., 86.
 Stone, W. E., 51.
 Stoner, M. A., 75.
 Stookey, E. B., 88.
 Storm, A. V., 64.
 Storvick, O. A., 8.
 Story, G. F. E., 61.
 Stott, M. L., 16.
 Stouder, K. W., 54.
 Stover, M. E., 43.
 Stover, W. G., 77.
 Strahan, J. L., 73.
 Strait, E. D., 4.
 Strait, H. G., 4.
 Strate, E. M., 49.
 Straughn, M. N., 19.
 Strauss, J. F., 24.
 Strausz, A. L., 88.
 Street, J. P., 45.
 Strode, S. E., 22.
 Strodtman, O. E., 56.
 Strong, Mrs. E. L., 58.
 Strowd, W. H., 91.
 Stryke, A. C., 73.
 Stuart, D., 8.
 Stuart, G. A., 16.
 Stuart, R. Y., 11.
 Stuart, W., 17.
 Stubbs, C. D., 41.
 Stubenrauch, A. V., 43.
 Stuckey, H. P., 47.
 Stuntz, S. C., 18.
 Sturdevant, L. B., 69.
 Sturtevant, A. P., 61.
 Suarez, E., 40.
 Suchtelen, F. H. H. van, 61.
 Sudro, W. F., 75.
 Sudworth, G. B., 10, 36.
 Suer, W. J., 54.
 Suggs, D. C., 47.
 Sullivan, A. L., 21.
 Sullivan, R. H., 7.
 Summers, H. E., 54.
 Summers, J. N., 25.
 Summers, T. H., 4.
 Supplee, G. C., 73.
 Surface, F. M., 59.
 Sutherland, I., 54.
 Sutton, J. A., 77.
 Sutton, L. F., 89.
 Swanson, C. O., 56.
 Swartwout, A. M., 67.
 Sweeney, M. E., 58.
 Sweeney, M. P., 74.
 Sweet, A. T., 23.
 Sweet, M. B., 49.
 Sweetser, C. H., 31.
 Swenchart, J., 91.
 Swenk, M. H., 69.
 Swenson, S. J., 88.
 Swezey, O. H., 48.
 Swingle, D. B., 68.
 Swingle, W. T., 14.
 Swire, R. P., 58.
 Switzer, H. B., 52.
 Swoboda, F. G., 91.
 Sykes, G. F., 79.
 Symons, T. B., 60.
 Szymoniak, B., 75.
 Taber, W. C., 21.
 Taft, P. C., 54.
 Taft, L. R., 62.
 Taggart, L. M., 54.
 Taggart, W. G., 58.
 Tague, E. L., 56.
 Tailby, G. W., jr., 73.
 Tait, C. E., 32.
 Talbert, T. J., 67.
 Talcott, A., 54.
 Taliaferro, W. T. L., 60.
 Talman, C. F., 6.
 Tanner, H. T., 65.
 Tannreuther, G. W., 67.
 Tappen, N. M., 40.
 Tarbox, F. G., jr., 82.
 Tartar, H. V., 79.
 Tate, H. D., 84.
 Tate, W. A., 40.
 Taubenhause, J. J., 45.
 Tavernetti, T., 43.
 Taylor, A. E. (Ohio), 77.
 Taylor, A. E. (U. S. D. A.), 23.
 Taylor, B. E., 75.
 Taylor, C. H., 56.
 Taylor, D. J., 47.
 Taylor, F., 32, 35, 36.
 Taylor, F. W., 70.
 Taylor, H. C., 91.
 Taylor, J. C., 68.
 Taylor, L. C., 40.
 Taylor, O. M., 74.
 Taylor, R. H., 43.
 Taylor, R. M., 62.
 Taylor, S. L., 31.
 Taylor, W. A., 13, 93.
 Taylor, W. J., 43.
 Teele, R. P., 32.
 Teesdale, C. H., 12.
 Temple, C. E., 60.
 Temple, J. C., 47.

- Templeton, G. S., 40.
 Templeton, M. E., 70.
 Tennant, H. V., 91.
 Terrell, R. C., 58.
 Terrell, W. G., 58.
 Terrill, B. M., 86.
 Test, L. A., 64.
 Thach, C. C., 39.
 Sharp, W. E., 23.
 Thatcher, L. E. (Mo.), 67.
 Thatcher, L. E. (Ohio), 77.
 Thatcher, R. W., 64.
 Thayer, C. L., 73.
 Thayer, P., 77.
 Thelen, R., 12.
 Theriault, E. J., 59.
 Thiessen, A. H., 7.
 Thom, C., 20.
 Thom, C. C., 88.
 Thomas, C. C., 73.
 Thomas, C. R., 31.
 Thomas, DeR., 41.
 Thomas, E. E., 43.
 Thomas, E. K., 82.
 Thomas, F. L., 40.
 Thomas, G., 35, 86.
 Thomas, H., 46.
 Thomas, J. L., 8, 85.
 Thomas, L., 75.
 Thomas, L. M., 15.
 Thomas, M., 75.
 Thomas, P. E., 56.
 Thomas, R. H., 47.
 Thomas, W., 80.
 Thomas, W. A., 82.
 Thompson, A. L., 73.
 Thompson, A. R., 28, 48.
 Thompson, B. F., 62.
 Thompson, B. L., 83.
 Thompson, C. W., 35, 36.
 Thompson, E. J., 75.
 Thompson, F., 45.
 Thompson, G. E., 56.
 Thompson, G. L., 89.
 Thompson, H., 4.
 Thompson, H. B., 70.
 Thompson, H. C., 17.
 Thompson, J., 15.
 Thompson, J. B., 28, 48.
 Thompson, J. I., 43.
 Thompson, L., 54.
 Thompson, M. J., 64.
 Thompson, O. A., 75.
 Thompson, S. C., 8.
 Thompson, W. C., 71.
 Thompson, W. O., 76, 93.
 Thomson, E. H., 4.
 Thomson, H. L., 78.
 Thomson, S. M., 4.
 Thornburg, M. G., 54.
 Thorne, C. E., 77, 93.
 Thornber, J. J., 41.
 Thornton, M. K., jr., 85.
 Throckmorton, R. I., 56.
 Thrun, W. E., 67.
 Thurston, W. B., 8.
 Thysell, J. C., 17.
 Tidestrom, I., 16.
 Tiebout, G. L., 58.
 Tiemann, H. D., 12.
 Tiffany, E. M., 56.
 Tiffany, H. E., 45.
 Tiller, R. J., 14.
 Tillman, B. W., 23.
 Tillotson, C. R., 12.
 Tillotson, E. C., 14.
 Timberlake, P. H., 23.
 Tisdale, H. B., 40.
 Tisdale, W. B., 65.
 Titlow, C. R., 89, 93.
 Titsworth, B. E., 73.
 Titus, E. G., 86.
 Tobey, E. R., 59.
 Tobin, J. J., 31.
 Tobiska, J. W., 44.
 Todd, C. C., 88.
 Tolaas, A. G., 64.
 Tolman, L. M., 21.
 Tolstrup, M. R., 54.
 Tomhave, W. H., 80.
 Tomkins, L. C., 80.
 Toms, R. E., 31.
 Tomson, W. E., 56.
 Torgerson, E. F., 50.
 Tormey, J. A., 88.
 Tormey, J. L., 91.
 Tothill, J. D., 73.
 Tottingham, W. E., 91.
 Tower, D. G., 23.
 Tower, D. J., 52.
 Tower, W. V., 81.
 Towle, R. S., 17.
 Towles, V. E., 31.
 Townsend, C. H. T., 25.
 Townsend, C. O., 17.
 Townsend, W. E., 15.
 Tracy, J. E. W., 17.
 Tracy, S. M., 16.
 Tracy, W. W., jr., 17.
 Tracy, W. W., sr., 17.
 Trahorn, A. T., 23.
 Transue, V. M., 59.
 Traum, J., 43.
 Travelbee, H. C., 52.
 Treacy, R. H., 8.
 Trescott, K. B., 82.
 Trescott, T. C., 20.
 Tretsvon, O., 68.
 Treuthardt, E. L. P., 19.
 Trilling, M. B., 64.
 Trimble, R. E., 44.
 Troop, J., 52.
 Trotter, F. B., 89.
 Trowbridge, E. A., 67.
 Trowbridge, G. E., 4.
 Trowbridge, P. F., 67.
 Troy, H. C., 73.
 Truax, H. E., 41.
 Truax, T. R., 54.
 True, A. C., 27, 39, 93.
 True, G. H., 43.
 True, R. H., 15.
 Truesdell, L. E., 11.
 Trullinger, R. W., 13.
 Truog, E., 91.
 Tubergen, C. B., 74.
 Tuck, C. H., 73.
 Tucker, D. B., 78.
 Tucker, E. S., 58.
 Tucker, G. M., 28.
 Tucker, J. R., 41.
 Tucker, M. L., 77.
 Tufts, W. P., 79.
 Tungen, G. H., von, 54.
 Turner, A. S., 87.
 Turner, C. F., 23.
 Turner, F., 50.
 Turner, F. J., 56.
 Turner, H. A., 4.
 Turner, J. A., 91.
 Turner, J. D., 58.
 Turner, L. G., 84.
 Turner, W. B., 25.
 Turner, W. F., 24.
 Turpin, G. M., 54.
 Turrentine, J. W., 23.
 Tuttle, E. M., 73.
 Tuttle, F. E., 58.
 Tuttle, H. F., 77.
 Tyler, C. A., 62.
 Tylor, A. R., 43.
 Ullsperger, H. W., 91.
 Umholtz, A. J., 67.
 Underwood, J., 67.
 Uphof, J. C. Th., 41.
 Upton, F. W., 69.
 Urbahns, T. D., 23.
 Urquhart, J., 87.
 Utt, C. A., 56.
 Vail, C. E., 44.
 Vaile, R. S., 43.
 Valgren, V. N., 35.
 Vallentgold, R. W. J., 17.
 Van Allsburg, P., 8.
 Van Alstine, E., 50.
 Vanatta, E. E., 67.
 Vanatta, E. S., 23.
 Vanatter, P. O., 47.
 Van Deman, R., 73.
 Vanderwilt, E. N., 56.
 Van Dine, D. L., 25.
 Vandracek, L. J., 15.
 VanDuyne, C., 23.
 Van Duzee, E. P., 43.
 Van Dyck, F. C., 70.
 Van Dyke, E. C., 43.
 Van Es, L., 76.
 Van Eseltine, G. P., 18.
 Van Fleet, W., 15.
 Van Hise, C. R., 90.
 Van Horn, E., 84.
 Van Hynning, T., 46.
 Van Kirk, M. S., 69.
 Van Kleek, J. R., 50.
 Van Meter, A. R., 77.
 Van Norman, H. E., 43.
 Van Nuis, C. S., 71.
 Van Rensselaer, M., 73.
 Van Slyke, L. L., 74.
 van Suchtelen, F. H. H., 61.
 Van Zile, M. P., 56.
 Van Zwaluwenburg, R. H., 28, 81.
 Vaplon, W. E., 44.
 Vasey, H. E., 69.
 Vaughan, E. A., 40.

- Vaughan, H. W., 54.
 Vaughan, R. E., 91.
 Vaughn, E. C., 58.
 Vaughn, H., 54.
 Vaulx, J., 41.
 Vawter, C. E., 87.
 Veatch, J. O., 23.
 Veihmeyer, F. J., 32.
 Veitch, F. P., 19.
 Verwiebe, W. A., 77.
 Vestal, C. M., 56.
 Vick, H. E., 73.
 Vickery, R. A., 23.
 Viehoever, A., 20.
 Vinall, H. N., 16.
 Vincent, C. C., 49.
 Vincent, G. E., 63.
 Vinson, A. E., 41.
 Vivian, A., 77.
 Vivian, C. A., 40.
 Vogt, P., 77.
 Volck, W. H., 43.
 Volz, E. C., 54.
 von Ende, C. L., 49.
 von Herrmann, C. F., 7.
 von Kleinsmid, R. B., 41.
 von Tungeln, G. H., 54.
 Voorhees, J. F., 84.
 Voorhies, E. C., 43.
 Vosbury, E. D., 17.
 Voshell, J. T., 31.
 Vrooman, C., 3.
 Wachter, H. M., 77.
 Waddle, N., 16.
 Wade, C. I., 87.
 Wade, J. A., 21.
 Wade, J. S., 23.
 Waggaman, W. H., 23.
 Waggoner, C. W., 89.
 Waha, A. O., 13.
 Waid, C. W., 62.
 Waid, E. D., 61.
 Wait, C. E., 84.
 Waite, M. B., 14, 36.
 Waite, R. H., 60.
 Walden, B. H., 45.
 Waldruff, P. H., 20.
 Waldron, C. B., 76.
 Waldron, L. R., 76.
 Waldron, R. A., 80.
 Wales, P. E., 87.
 Walker, B., 54.
 Walker, B. M., 65.
 Walker, C. H., 20.
 Walker, E., 40.
 Walker, G. B., 65.
 Walker, G. G., 77.
 Walker, H. B., 56.
 Walker, H. F., 33.
 Walker, J. C., 91.
 Walker, L. S., 61.
 Walker, S. S., 46.
 Walker, W. B., 4.
 Walkey, F. L., 52.
 Wallace, R. C. E., 52.
 Waller, A. E., 77.
 Waller, C. H., 85.
 Waller, O. L., 88.
 Walls, E. E., 54.
 Walster, H. L., 91.
 Walters, E. H., 14.
 Walton, C. F., jr., 28, 30.
 Walton, G. P., 20.
 Walton, M. R., 31.
 Walton, R. C., 77.
 Walton, W. R., 23.
 Walworth, E. H., 50.
 Walz, F. J., 7.
 Walz, J., 91.
 Warber, G. P., 34.
 Warburton, C. W., 15.
 Ward, A. R., 9.
 Ward, D. D., 17.
 Ward, F., 88.
 Ward, W. F., 7.
 Ware, A. S., 85.
 Wark, A. C., 71.
 Warner, A. J., 73.
 Warner, D. E., jr., 45.
 Warner, K. F., 69.
 Warren, G. F., 73.
 Warren, G. M., 32.
 Warsaw, W. W., 73.
 Wascher, F. M. W., 50.
 Washburn, F. L., 64.
 Washburn, H. J., 9.
 Washburn, R. M., 64.
 Washburn, R. S., 4.
 Washburn, W. F., 76.
 Washington, B. T., 40.
 Washington, Mrs. B. T., 40.
 Washington, B. T., jr., 40.
 Washington, J. I., 83.
 Waters, H. J., 55, 93.
 Watkins, D. W., 8.
 Watkins, L. J., 40.
 Watkins, O. S., 50.
 Watkins, W. E., 57.
 Watkins, W. I., 23.
 Watrud, H. O., 91.
 Watson, E. B., 23.
 Watson, E. J. (La.), 58.
 Watson, E. J. (U. S. D. A.), 22.
 Watson, I. A., 22.
 Watson, J. G., 67.
 Watson, J. R., 46.
 Watson, J. W., 87.
 Watson, L. O., 14.
 Watson, O. M., 84.
 Watson, P. P., 83.
 Watt, A., 62.
 Watts, H. R., 84.
 Watts, R. L., 80.
 Waugh, F. A., 61.
 Way, A. E., 43.
 Weakley, C. E., jr., 89.
 Weaver, F. P., 80.
 Weaver, L. A., 67.
 Webb, H. J., 86.
 Webb, J. L., 23.
 Webb, W. S., 58.
 Webb, W. W., 40.
 Webber, H. J., 43, 93.
 Webber, R. T., 25.
 Weber, F. C., 18.
 Webster, F. M., 23.
 Webster, H., 28.
 Webster, R. L., 54.
 Webster, R. O., 20.
 Weeter, H. M., 50.
 Wegner, E. E., 88.
 Weigel, A. G., 78.
 Weimer, J. L., 73.
 Weir, J. R., 14.
 Weir, W. J. R., 31.
 Weir, W. W. (Cal., U. S. D. A.), 32, 43.
 Weir, W. W. (Wis.), 91.
 Weisner, G. H., 54.
 Weiss, H. F., 12.
 Welch, C. H., 64.
 Welch, E. G., 47.
 Welch, H., 68.
 Welch, J. P., 86.
 Welch, J. S., 49.
 Welch, P. S., 57.
 Welch, R. R., 8.
 Weld, L. D. H., 34, 64.
 Weller, M., 64.
 Wellington, C., 61.
 Wellington, J. W., 74.
 Wellington, R., 64.
 Wells, B. W., 57.
 Wells, C. A., 47.
 Wells, E. L., 7.
 Wells, H. C., 31.
 Wells, S. D., 12.
 Wells, W. G., 15.
 Welton, F. A., 77.
 Wendelkin, G. M., 73.
 Wene, E. H., 71.
 Wentling, J. P., 64.
 Wentworth, E. N., 57.
 Wentz, J. B., 17.
 Werff, H. A. de, 49.
 Wermelskirchen, L., 15.
 Werner, H. O., 76.
 Werner, H. R., 54.
 Werner, J. C., 57.
 Werner, P., 67.
 Werthmueller, F. R., 48.
 Wessels, P. H., 82.
 Wessling, H. L., 21.
 West, F. L., 86.
 West, J. T., 65.
 West, R. B., 86.
 West, R. M., 64.
 Westbrook, E. C., 47.
 Westcott, J. C., 87.
 Westgate, J. M., 28, 48.
 Westgate, V. V., 88.
 Westover, H. L., 16.
 Wharton, G. W., 4.
 Wheeler, B. I., 42.
 Wheeler, B. L., 11.
 Wheeler, C. S., 77.
 Wheeler, H. C., 50.
 Wheeler, R., 50.
 Wheeler, R. H., 73.
 Wheeler, W. P., 74.
 Wheelock, W. R., 41.

- Whetzel, H. H., 73.
 Whipple, O. B., 68.
 Whisenand, J. W., 50.
 Whitaker, J. A., 31.
 Whitechurch, J. E., 50.
 Whitecomb, E. S., 92.
 Whitecomb, W. O., 68.
 White, A., 60.
 White, A. R., 16.
 White, B., 75.
 White, C. W., 58.
 White, D. G., 12.
 White, D. S., 76.
 White, E. A., 73.
 White, E. N., 77.
 White, F. M., 91.
 White, G. C. (Conn.), 45.
 White, G. C. (U. S. D. A.), 33.
 White, G. F., 25.
 White, G. L., 62.
 White, G. R., 40.
 White, H. B., 64.
 White, H. C., 47.
 White, H. J., 60.
 White, H. L., 76.
 White, J. K., 22.
 White, J. W., 80.
 White, O. K., 62.
 White, S., 87.
 White, T. H., 60.
 White, W., 8.
 White, W. H., 24.
 White, W. J., 89.
 White, Mrs. W. P., 47.
 White, W. R., 80.
 Whitehill, A. R., 89.
 Whitehouse, A. W., 44.
 Whiting, A. L., 50.
 Whiting, R. A., 52.
 Whitlock, B. W., 68.
 Whitman, H. A., 20.
 Whitmarsh, R. D., 77.
 Whitney, C. W., 73.
 Whitney, E. M., 45.
 Whitney, M., 22, 93.
 Whatsit, L. A., 13.
 Whitson, A. R., 91.
 Whitson, L. R., 64.
 Whittaker, H. D., 88.
 Whittelsey, A. H., 30.
 Whitten, A. A., 45.
 Whitten, J. C., 67.
 Whittenton, R. O., 78.
 Whittier, A. C., 45.
 Whittier, E. O., 59.
 Whittle, C. A., 47.
 Whittlesey, E. B., 45.
 Wiancko, A. T., 52.
 Wichmann, H. J., 19.
 Wicks, W. H., 41.
 Wickson, E. J., 43.
 Widmer, M. M., 92.
 Widtsoe, J. A., 85.
 Wiegand, K. M., 73.
 Wiegand, M. C., 73.
 Wiggans, C. C., 67.
 Wiggin, G. H., 64.
 Wight, A. E., 8.
 Wight, C. J., 43.
 Wight, W. F., 17.
 Wilcox, A. C., 54.
 Wilcox, E. M., 69.
 Wilcox, E. V., 28.
 Wilcox, R. B., 14.
 Wilde, E. I., 80.
 Wilder, H. J., 30.
 Wilder, S., 64.
 Wildermuth, V. L., 23.
 Wiley, R. C., 57.
 Wilkinson, A. E., 73.
 Wilkinson, E., 86.
 Wilkinson, J. A., 54.
 Wilkinson, R. S., 82.
 Willaman, J. J., 64.
 Willard, J. T., 57.
 Willard, R. E., 4, 85.
 Willey, L. D., 17.
 Willey, L. E., 54.
 Williams, A., 50.
 Williams, B., 87.
 Williams, C. B., 75.
 Williams, C. G., 77.
 Williams, C. M., 67.
 Williams, E., 47.
 Williams, E. E., 69.
 Williams, G., 67.
 Williams, G. A., 54.
 Williams, G. I., 64.
 Williams, H. B., 77.
 Williams, H. E., 5.
 Williams, H. S., 67.
 Williams, J. J., 71.
 Williams, J. O., 82.
 Williams, L., 40.
 Williams, L. F., 75.
 Williams, M. B., 32.
 Williams, O. E., 8.
 Williams, R. C., 60.
 Williams, R. H., 41.
 Williams, R. W., 3.
 Williams, W. L., 9.
 Williams, W. T. B., 87.
 Williamson, C. G., 86.
 Williamson, C. M., 75.
 Williamson, H. H., 85.
 Williamson, J. T., 40.
 Williamson, W., 64.
 Willier, J. G., 15.
 Willis, L. G., 84.
 Willis, R. L., 71.
 Willison, F., 77.
 Willoughby, C. L., 46.
 Willson, C. A., 84.
 Willson, G. H., 6, 7.
 Wilson, A., 64.
 Wilson, A. D., 63.
 Wilson, B. S., 57.
 Wilson, C. E., 65.
 Wilson, C. P. (N. Mex.), 71.
 Wilson, C. P. (U. S. D. A.), 19.
 Wilson, C. S., 22.
 Wilson, F. H., 70.
 Wilson, F. W., 69.
 Wilson, G., 78.
 Wilson, G. M., 54.
 Wilson, H. C., 40.
 Wilson, H. F., 79.
 Wilson, J., 54.
 Wilson, J. A., 78.
 Wilson, J. B., 18.
 Wilson, J. J., 64.
 Wilson, J. K., 73.
 Wilson, J. W., 83.
 Wilson, M., 57.
 Wilson, M. L., 68.
 Wilson, M. M., 69.
 Wilson, P. St. J., 30, 31, 32.
 Wilson, R., 64.
 Wilson, R. N., 23.
 Wilson, T. S., 23.
 Wilson, W. M., 7, 73.
 Wilson, W. R., 70.
 Winans, L. L., 31.
 Winckelmann, H., 14.
 Wing, H. H., 73.
 Winkjer, J. G., 8.
 Winslow, C. P., 12.
 Winslow, D. H., 31.
 Winsor, L. M., 32, 86.
 Winston, J. R., 79.
 Winston, R. A., 23.
 Winter, O. B., 62.
 Winters, N. E., 85.
 Winters, R. Y., 75.
 Wirt, F. A., 57.
 Wise, F. B., 15.
 Wise, L. E., 21.
 Withers, W. A., 75.
 Withrow, J. R., 77.
 Withyeombe, R., 79.
 Witmer, E., 21.
 Wodsedalek, J. E., 49.
 Woglum, R. S., 24.
 Wojta, J. F., 91.
 Wolcott, G. E., 8, 60.
 Wolcott, G. N., 81.
 Wolf, F. A., 40.
 Wolfe, A., 54.
 Wolfe, S. L., 12, 13.
 Wolff, W. H., 70.
 Woll, F. W., 43.
 Wonders, J. C., 31.
 Wood, A. T., 85.
 Wood, C. A., 85.
 Wood, D. C., 68.
 Wood, H. P., 25.
 Wood, I. D., 69.
 Wood, W. B., 24.
 Wood, W. P., 62.
 Woodard, C. S., 78.
 Woodard, J., 77.
 Woodbury, C. G., 52.
 Woodbury, T. D., 13.
 Woodcock, E. F., 62.
 Woodin, G. C., 62.
 Woodman, A., 64.
 Woodman, L. E., 59.
 Woods, A. F., 63, 93.
 Woods, C. D., 59, 93.
 Woods, M., 40.

- Woods, W. C., 73.
Woodward, B. T., 9.
Woodward, E. G., 69.
Woodward, H. E., 18.
Woodward, K. W., 13.
Woodward, S. M., 32.
Woodward, T. E., 8.
Woodward, W. C., 21.
Woodworth, C. M., 91.
Woodworth, C. W., 43.
Woolman, H., 88.
Woolridge, R., 25.
Wooton, E. O., 4.
Worden, G. N., 59.
Work, P., 73.
Working, D. W., 30.
Works, G. A., 73.
Worrel, M. E., 31.
Worsham, W. A., jr., 47.
Worst, J. H., 75, 93.
Worthen, E. L., 80.
Worthley, L. H., 25.
Wright, C. D., 19.
Wright, H. K., 58.
Wright, P. A., 8.
Wright, R. C., 14.
Wright, R. G., 70.
Wright, R. R., 47.
Wright, T., 36.
Wright, T. H., 88.
Wright, W. H., 91.
Wright, W. R., 49.
Wright, W. T., 85.
Wyatt, W. C., 30.
Yanovsky, E., 19.
Yapp, W. W., 50.
Yarnell, D. L., 32.
Yeaton, G. A., 59.
Yensey, H. F., 67.
Yerby, E. D., 26.
Yerkes, A. P., 4.
Yingling, C. K., 23.
Yocum, H. B., 57.
Yoder, M., 15.
Yoder, P. A., 17.
Yohe, H. S., 32.
Yoke, J. J., 50.
Yothers, M. A., 88.
Yothers, W. W., 24.
Young, H. B., 73.
Young, H. C., 75.
Young, H. D., 43.
Young, H. J., 69.
Young, H. P., 80.
Young, J. P., 15.
Young, M. H., 85.
Young, N. B., 46.
Young, R. A., 18.
Young, T. B., 15.
Youngblood, B., 22, 84.
Youngburg, G. E., 83.
Younge, P. L., 40.
Zappone, A., 26.
Zeasman, O. R., 91.
Zeeuw, R. de, 62.
Zentmire, D. H., 54.
Zentmire, Z., 54.
Zimmer, E. R., 73.
Zimmerley, H. H., 87.
Zinn, J., 59.
Zon, R., 12.
Zook, L. L., 17.

